

Business and Investment Forecasting

Forecasting Methods and Their
Practical Application

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Incorporated*



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BUSINESS AND INVESTMENT FORECASTING

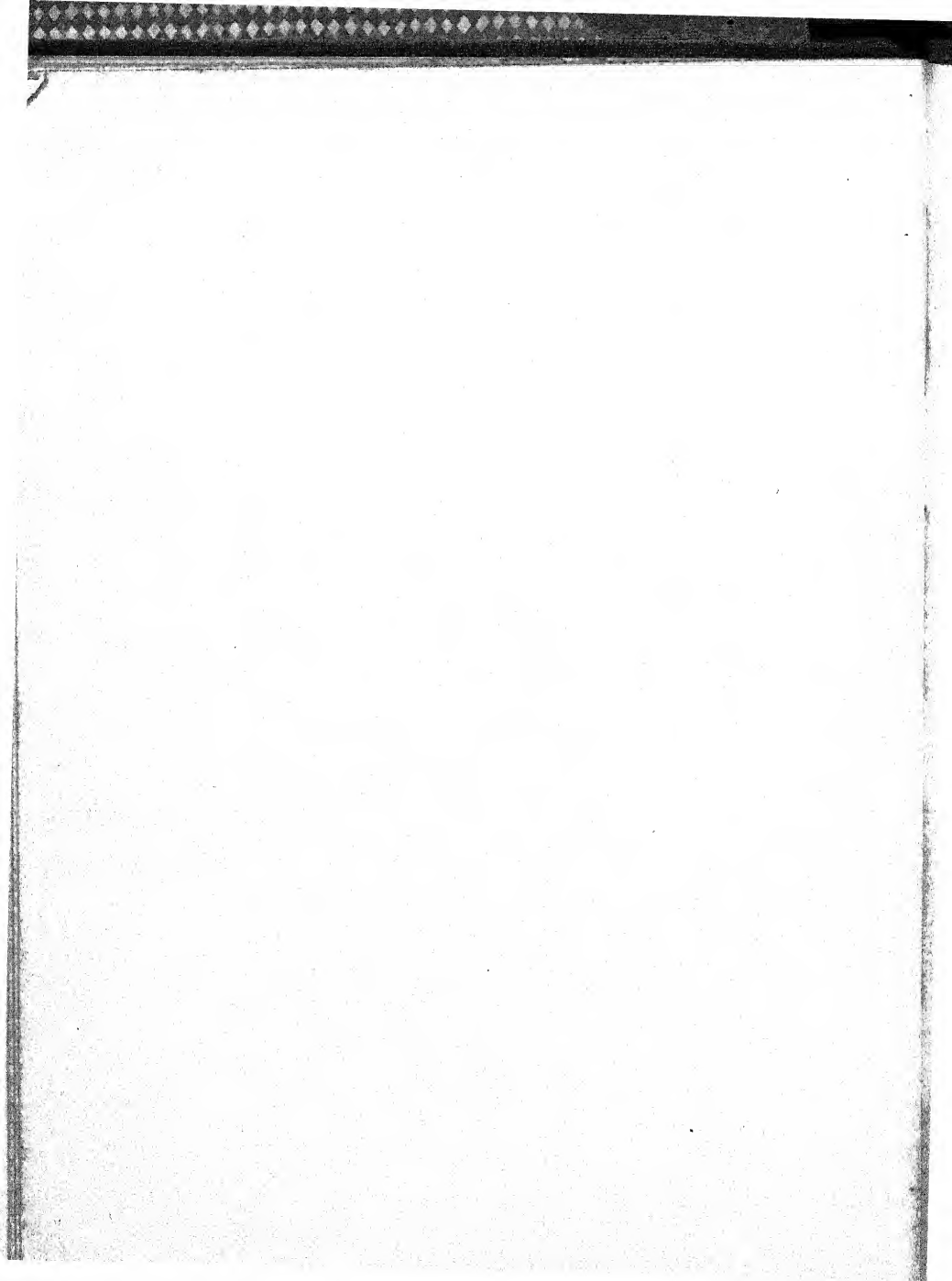
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PREFACE TO REVISED EDITION

THE three years which have elapsed since the original printing of this work have seen marked advances in the study of business economics, and in its application to the forecasting of business movements and of security price fluctuations. These years have also seen considerable progress toward stabilization of post-war business conditions, but, with the United States still holding an abnormal percentage of the total gold supply of the world, as Germany did in the early 1870's, the need for an accurate foresight of the consequences of current business movements promises to be exceptionally great during the next few years. For these two reasons it has seemed worth while to undertake a thorough revision rather than simply to reprint the book which was issued in 1922.

Generally speaking, the principal changes introduced by the revision are of the following types:

1. Certain points where the original edition apparently failed in clearness of statement have been rewritten or considerably amplified.

2. Certain new material dealing with the work of other writers during the past three years has been introduced.

3. The work done by the writer and his associates has been brought to date. In this item special mention should be made of the work of McDonald H. Wilson, head of the Statistical Laboratory of the Brookmire Economic Service, who, more than any other individual, is responsible for the advances along that line during the past three years.

RAY VANCE

NEW YORK,
August 8, 1925.

PREFACE

THE primary purpose of writing this book has been to serve the active business man or investor who lacks either the time or the inclination to become an expert statistician, but who wishes to shape his business or investment policies upon a sound analysis of economic conditions. It is hoped that the book will also be of use to students for some ideas and principles of forecasting, which have grown out of eleven years' practical experience, but which have never previously been published. However, in each case which has presented a conflict between the interests of the practical user of statistics, and those of the theoretical investigator, preference has been given to the needs of the former. This has had the following results:

1. Attention has been concentrated upon the *use* of statistical barometers rather than upon their *preparation*.

2. All attempts to cover detailed mathematical formulæ have been omitted.

3. Considerable space has been spent in discussing the general economic principles that underlie the construction of business barometers, as distinguished from the purely mathe-

matical operation of their actual construction.

4. From the student's viewpoint a disproportionately large amount of space has been given to the forming of policies after we assume that an accurate forecast has been made.

I regard business forecasting today as a field for the economic engineer rather than for the inventor, so that it will be impossible to make acknowledgment of all the sources from which the material has been drawn. However, in addition to the specific acknowledgments made in the text itself, I wish to mention obligations to James H. Brookmire and Warren F. Hickernell who laid the scientific groundwork of the original Brookmire Economic Service, and to Oswald Knauth of the National Bureau of Economic Research, Inc., New York City, who has been kind enough to read and criticize the manuscript. Finally, the fullest acknowledgment is due to the Brookmire Consulting Board, N. E. Peieff, John C. Howell, Alden Anderson, Richard S. Conway and Alexander Vincent, whose work has been so important in the development of what are presented in this book as my own ideas, that they might almost be called co-authors.

RAY VANCE

NEW YORK, N. Y.,
August 10, 1922.

*Business and Investment
Forecasting*



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CHAPTER I

RELATION OF BUSINESS STATISTICS TO THE HUMAN ELEMENT

THE most important point regarding business statistics is their relation to the human nature of business executives and of investors. Men are not created to serve business but rather every phase of business has been created by the working out of human desires. The great financier lays his plans in millions or even in billions of dollars, while the corner grocer plans intensively to add a few hundred dollars to his annual profits. But, whether the end attained be the laying of a transcontinental railroad or the breaking of a sales record in a one-man territory, every business achievement draws its initiative from the personality of some man or the personalities of some group of men who look ahead and plan for that which is yet to be.

From this fundamental fact arises the romance of business, and, because the desire for

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romance is one of the most deeply seated human instincts, we find in this a dynamic force which drives many to business activity far more intense than ever could be secured through a desire to satisfy personal wants. Whenever, therefore, any apparently new factor seeking to enter the general business field seems to threaten a curtailment of the application of personality and of imagination to business or to investment operations, it is at once met by two great objections:

1. The intellectual objection that, if personal initiative be eliminated, progress will stop.

2. The emotional, and perhaps inarticulate, objection that, if personal initiative is to be handicapped, the interest or the "fun" of business will be appreciably lessened.

Some business men will consider these objections as trivial, but the course of material progress does depend upon human effort to an extent that completely absorbs all other factors, and it is equally true that the maximum of that effort is never obtained without pleasurable interest in the task to be accomplished; therefore, any method of business operation which takes from the worker the possibility of such pleasurable interest must be a tremendous handicap. And, since the use of business statistics is primarily intended for those in executive positions or for those who are saving and investing their money,

such a condition arising from their further use would be an insuperable objection. As a matter of fact, those who object to the use of statistical bases in the formation of forward looking business plans either have a misconception of what business forecasting means, or else have failed to realize the difference between mere day dreams and constructive imagination.

Let us take an illustration of this difference from a time far enough in the past so that we can view it without the personal bias which tends to muddle our judgment of happenings in the immediate past. First, let us go back to the early days of the seventeenth century. At that time the Virginia Company, a great stock company organized in London, had for its chief property an indefinite stretch of territory covering most of the Atlantic coast of what is now the United States. About this territory the managers of the Virginia Company had only two positive facts:

1. It supported a luxuriant vegetation in a climate pleasant for European occupation.
2. It lay to the west of Europe and if one went far enough in that direction he would arrive at the east coast of Asia where spices, pearls and gold might be had.

To be sure, a few tiresome mathematicians had taken such a dry fact as the known curva-

ture of the earth's surface, and had determined that the east coast of Asia must lie thousands upon thousands of miles beyond the east coast of North America, but the management of the Virginia Company was scornful of such a theoretical and hampering fact. Accordingly they instructed their exploring expedition first to reach the east coast of North America and then "to discover the way to China and the East Indies and to bring back a treasure of spices, pearls and gold." When the expedition had reached the coast of North America, a ship's pinnace actually did sail up the James River in Virginia. Half of the men were lost on the trip up the river while half of the remainder died on a swampy island. There was no attempt to found an agricultural colony as they might have done had they connected their efforts with the luxuriant vegetation.

The expedition did not reach Asia because there was no road to Asia the way they went, and their means were not adequate for the passage had such a road existed. They did not bring back spices, pearls or gold, for none of those things existed in the country through which they traveled. The whole plan was a day dream, absolutely unconnected with the facts. It cost them not only the time, resources and lives spent in the expedition itself, but for

a long time actually cost them all confidence in the value of the New World.

Now compare this with constructive imagination. After the close of the Revolutionary War, in that period of history before the formation of the United States Constitution, George Washington, who had just proved his courage to attempt the difficult through seven hard years of war, but who, through those same years of war, had learned the necessity of fitting his plans to real conditions, turned his attention to the great interior which was separated from the original thirteen colonies by mountain ranges. About this interior he knew the following facts:

1. Already several hundred thousand Americans were living in that territory.

2. These Americans had long but easy access to the sea through westward and southward flowing rivers.

3. They had short but difficult eastward access to the sea through land routes over the high places of the mountains.

4. In addition, he realized one fact, known to very few of his contemporaries, that, while this country had no gold, pearls or spices, it had resources which must ultimately make it the home of many millions.

Taking these known facts as a basis, Washington's constructive imagination caused him to make the following forecast: "There are

one hundred thousand souls West of Laurel Hill who are groaning under the inconveniences of long land transportation. . . . If this cannot be made easy for them to Philadelphia . . . they will seek a mart elsewhere. . . . An opposition on the part of government . . . would ultimately bring on a separation between its Eastern and Western settlements; towards which there is not wanting a disposition at this moment in that part of it beyond the mountains. No well informed mind need be told that the flanks and rear of the United territory are possessed by other powers, and formidable ones too—nor how necessary it is to apply the cement of interest to bind all parts together, by one indissoluble bond—particularly the middle states with the country immediately back of them—for what ties let me ask should we have upon those people, and how entirely unconnected we should be with them if the Spaniards on their right or Great Britain on their left, instead of throwing stumbling blocks in their way as they do now, should invite their trade and seek alliance with them?"

The pessimistic part of Washington's forecast was almost realized in the early days of the nineteenth century during the plots of Wilkinson and Burr, and had not his "foresight of consequences" been accompanied by some very definite steps in the way of "provision against

them"¹ its realization would have been an easy possibility.

But Washington and other far-sighted men did provide against these consequences. They began to search for a way through the mountains. The trapper, the Indian, the trader and the settler had all been making their way over the highest trails for the sake of safety from human enemies who could be watched from heights but who might swoop down in surprise attacks upon the valleys. But Washington said there must be lower trails which could be used by peaceful commerce. He studied additional facts regarding topography from every available hunter, trapper, trader, Indian fighter or Indian who knew the mountain trails and the contour of the ranges. He also sent out surveying parties and, in cooperation with associates whom he secured, determined five available routes through these mountains; routes which are today occupied by the New York Central, Erie, Pennsylvania, Baltimore & Ohio and Chesapeake & Ohio Railroads. Over these routes they started the best transportation systems possible under the scientific development of their day, and not only did a great stroke of statesmanship for the new Republic, but incidentally added tremendously to their private

¹ Forecast: Foresight of consequences and provision against them.—Webster's Dictionary.

fortunes. That was constructive imagination because it was based on facts.

Similarly, we might compare two illustrations of more recent years. In the demoralizing depression which visited the United States at the opening of the great European War, some men, studying precedents and using constructive imagination, expanded their productive capacity or invested in additional productive property, thereby reaping fortunes. Other men, in the midst of the brief frenzy which characterized the year following the close of the war, expanded their productive capacity or invested in productive property, day dreaming of another opportunity like the one which had already passed, and found themselves at the close of 1920 facing extreme losses or even bankruptcy. It is a romantic thing, and, if you like, a magnificent thing, to dream of a great business accomplishment which is impossible under existing conditions, and to follow out that dream until it ends in bankruptcy; likewise it is a very stupid thing, and since it inevitably involves losses to those who have granted credit to the dreamer, or who have invested capital with him, it is an ethically unsound thing. The world is so full of unachieved things possible of achievement, that human initiative need never be handicapped by looking the facts squarely in the face. Business statistics properly applied

are adapted not only to guide efforts away from paths of impossibility, but also to bring to light the path of possibility through difficulty where no path was known to exist before the facts were fully known. If they are used to keep initiative confined to old ruts then that is the fault of the user himself, and a change in method of use, rather than the abandonment of the activity, is the proper remedy.

Having considered these objections to the use of business statistics, let us now consider the positive reasons why they should be used.

A MACHINE FOR THE MIND

Our physical bodies are born into a world in which are many tasks needing a twenty-foot arm, having the lifting power of many giants. Confronted with such tasks, we do not take our bodies into a gymnasium with a lot of apparatus for exercise and try to develop a human arm long enough and strong enough to meet the need. For uncounted generations human physical power was intensively developed, both in the gymnasium and in the training school of hard physical labor, without attaining such a result. Then some one built a crane. It was not a perfect thing, but it helped much in lifting the loads. Later we made steam cranes and electric cranes till we have multiplied by hundreds or

even by thousands our ability to lift physical weights.

Similarly, our minds are born into a civilization whose mental tasks are beyond the grasp of the greatest intellectual giant. Mere mental discipline was not enough. Hope of progress lay along the line of some great improvement in the equipment for the human mind to use in analyzing and grasping these problems; just as the human body had been aided by machines in lifting its loads.

If an engineer wants to know the height of a hill above a lake at its foot he does not erect a clumsy physical device to measure it with a tape line. He takes certain available measures and certain angles, and then by mathematical laws he determines the measurement he wishes to know. Or if he desires to know the strain which will fall upon a certain steel beam after a structure is completed he appeals to laws of mathematics, and knows what must be the strength of the beam *before* the building is even begun. The mathematical laws involved are available to anyone who will learn how to use them, and they are as much an outside machine to be used by that engineer's skilled mind as is the crane which will later be used to hoist the steel beam into place, a machine to be used by physical skill.

For generations now this "thought-machine"

of mathematical law has been used in the physical sciences, but its application to business and economic happenings is a newer development.

We pick up a newspaper and read that pig iron production has made a new high record. On another page we read that stock prices yesterday had a great drop; a third item tells us that call money was in good supply at lower rates; another says that wheat acreage has expanded; still another that cotton acreage has expanded. We meet a friend who is a salesman and he tells us that his house has just broken all sales records. Another says the business of his firm has slowed down. What do all of these mean? Each one taken by itself means very little. Each one has at some time appeared just before a great decline in business. If we throw the whole mass at our minds without some plan of analysis, and some rules of valuation, then our minds are as unable to handle them as our bodies are to lift a ton of rock. Economic statistical devices are the machines by which such an analysis and valuation can be made.

COVERS STRATEGY NOT TACTICS

Business activities, like military activities, have come to be sharply divided between tactics and strategy. "Tactics" is the knowledge of how to make an attack, but "strategy" deter-

mines when and where the attack shall be made. The older military strategists did wonderfully well with their limited means of gaining information, but a Napoleon would have fared badly had he attempted to command in the recent World War with such sources of information as he had in his actual battles. However, a Napoleon would not have fared badly, for he would have availed himself of airplane scouts and all other modern methods of gaining information.

Similarly, the great business strategists of the past would fare badly if they were alive today, and relied upon their old methods of forming business plans. But they would not really fare badly, for they would meet the new competitive condition in the only way it can be met—that is, by the use of this newer type of mental machine.

CRITICISM OF STATISTICIANS

So far we have concentrated our attention upon the attitude of investors and business men as users of statistics, but it seems worth while here to say something about the difficulties which have arisen from the attitude of professional statisticians themselves. In too many cases the professional statistician has been interested in his reputation with other statis-

ticians, rather than in the securing of results really useful to the man who has not had a specialized statistical education. Too often he has talked or written in a language composed of the formulæ of higher mathematics, which have no more meaning to the vast majority of possible users than if he had talked or written ancient Greek. At other times he has been impatient with any attempt to check up his result by the factor of judgment. Too often he has wasted his own time and that of his employers with interminable discussion over hair-splitting points in statistical methods, where any one of three or four recognized methods would give results showing substantial agreement. This is not intended as any defense of slipshod methods in either the gathering or the interpretation of statistics, for unless there is reasonable accuracy in such work the results will be worse than nothing. The point to be stressed is that such a gathering and compilation is a profession in itself and the user of statistics should no more be expected or required to know all of its technical phases than the taker of medicine should be required to study all of the technical facts of medical science.

Briefly stated, the relationship of business statistics to the human user is that of a machine to its user. Of itself, the machine cannot perform any work, but there are certain things for

which it is designed in the performance of which it will greatly increase the efficiency of the user. Similarly, the more expert the user becomes the greater the value he will get from the machine, and if he is not expert enough to keep it in first class condition himself he can add to its efficiency by expert service from the outside.

EIGHT FUNDAMENTALS

It will help every man who tries to use this machine of statistical research if he remembers eight fundamental facts:

1. It will be necessary for him to develop a sufficient amount of patience to wait for things if he is to gain any real advantage. The man who is impatient to reap profits within a few weeks will get little assistance from a study of business fundamentals.

2. Another element in the human attitude toward this machine must be that of patient research into things which happened in the past. These are not so much of value for themselves but because, as one great historian said, "I know no way of judging the future but by the past." Many individual users will be able to delegate these researches to other individuals, but all of the forward looking must have a basis in accurate knowledge of the past.

3. There are some factors in every man's

business career which he must make subordinate to his own will if he expects to make a success, factors over which he can have a reasonable probability of making his control effective. These factors, covered by the internal statistics of his own business, he will watch with the idea of fostering the favorable and checking the unfavorable and will find that the knowledge of them in advance tremendously increases his power for intelligent management of his own business.

4. He will measure other groups of statistical facts which represent forces over none of which he individually has control and over many of which, even in cooperation with others, he can exercise very little control. Some of these factors will limit his activity because they show difficulties in the way of accomplishment, but an equally great number of them will be found to point the way to accomplishments which were not previously considered possible.

5. Perhaps the most difficult to cultivate of all the qualities which business success demands is the ability to wait, at one time, and then to combine this with the ability to act promptly, at another time, when conditions are right. To fortify these two weak points in the mental equipment of the average business man is one of the most useful things which business forecasting can possibly accomplish. When the

present is rosy it is extremely hard to refrain from expansion and from the beginning of new projects, yet experience teaches that the height of the tide is the worst of all points for the beginning of a new enterprise or the expansion of an old one. It is equally hard to muster the courage for expansion when the trough of depression has been reached, yet this is the time when expansion or the starting of a new enterprise may be undertaken with the greatest possible chance of profit. The same conditions as to tops and bottoms are equally trying for security buyers. Therefore, just as the time element is the most important fundamental factor of forecasting itself, so ability to grasp that point and make use of it is the most valuable single quality for a human user of business statistics.

6. Again, because business forecasting is a mathematical approximation rather than an exact mathematical computation, the human user of business statistics must always keep alert for possibilities that may improve his approximations.

7. Business men and investors must realize that they are subject every day to arguments in which others seek to use alleged economic facts or statistics to influence action. The man who is ignorant of current economic developments and of reasonable statistical conclusions labors

under a great handicap in the modern business organization.

✓ 8. Finally, the user of business statistics must use them with constructive imagination, not allowing facts to drive him into hopeless conservatism but seeking through facts to find paths into new fields of usefulness and of consequent profit.

These qualifications on the part of a human user of business statistics are simply suggested by the nature of the machine which he is to use. They do not mean that it is necessary in any way to limit the initiative of business managers or investors, but they do mean that by adapting their methods to this machine of greater knowledge they are able to apply that initiative in a decidedly more effective way.

CHAPTER II

THE USE OF BUSINESS STATISTICS

IF it is not useful then it is not worth while. Should that sentence be applied to the whole range of human activity and environment, then the definition of the word "useful" must be expanded to such an indefinite extent as to take away all real value from the entire conception; but when the application is limited strictly to business considerations and to either business or financial management, then the idea may be accepted as true in the common and restricted sense of the word "useful."

This always was true, even in the days when business was local and extremely simple in its forms of organization, but the necessity for keeping it in mind has been tremendously increased with the coming of complex organizations for production, financing and marketing. Today the business executive is compelled to spend a very large proportion of his time and of his resources in activities whose ultimate benefit must be of an indirect nature. On account of this he is in constant danger of wasting both

time and resources in activities whose ultimate benefit is really nothing.

Into such a situation the past twenty years have brought a constantly growing activity called "business statistics." This activity can contribute only indirectly to greater production or to larger profits, and before the business manager or the financial manager who invests funds devotes either time or money to such an activity, he is justified in asking the business statistician, "What value am I going to get out of it?"

At first glance, statistics, being concerned directly with figures, seem to be only an expansion of accountancy, which has been a part of business organization for so long that our ancestors were accustomed to call their offices "counting houses." Indeed it is true that business statistics must always include accounting as one of its basic factors, and it is probably fair to say that it represents an expansion of this field rather than a radical change. Professor Horace Secrist has stated the relationship between the two as follows:

"Accounting is concerned with the value aspect of these problems; statistics relates to the numerical or quantitative aspect whether value or some other unit is chosen as a measure of activity."¹

¹ Introduction to *Statistical Methods*, p. 10.

This definition is accurate so far as it goes, but it does not seem to get entirely to the root of the matter. A little earlier in the same work the same author says that "numerical facts are statistics only when 'placed in relation to each other.'"¹ This statement goes more nearly to the heart of the matter, but does not make clear the true distinction between business statistics and the older ideas of accounting. The most vital difference between accounting and business statistics lies in the all pervading attitude toward the time element. To render accounting means, literally, to state in concrete figures what has been done in the past, and by such definition accounting may be readily expanded to include those statistical activities which have to do with information regarding past happenings. But if such statistics are to be more than a doubtful asset to the business manager or to the investor, the statistician must take the forward looking attitude, must think in terms of the future rather than of the past, must indeed become a forecaster in the sense that forecasting is defined in Webster's Dictionary as "Foresight of consequences and provision against them."

The very use of the word forecast in connection with business administration or with investment naturally raises the question whether such an accomplishment is possible. That matter

¹ Introduction to *Statistical Methods*, p. 9.

will be taken up more thoroughly in a later chapter, but for the present it may be stated briefly that the business statistician believes it to be possible and that this factor runs through every item of useful service which he expects to render to the business manager or to the investor.

When the business statistician began to talk about forecasting, the word itself was relatively a stranger in the average man's vocabulary, its use being confined rather closely to the Federal Weather Bureau and the Crop Bureau of the Department of Agriculture. However, the idea in an uncrystallized form has always been one of the most common factors in all human activity. To draw an example familiar to practically every American man or boy, we sometimes see a baseball team in the field with its right fielder playing close to the foul line but an exceptionally long distance away from the diamond, its center fielder in the right fielder's normal position but also far from the diamond and similarly the left fielder playing deep in the center fielder's position. At the same time each of the infielders will be found moved towards the first base line and farther away from the home plate than the ordinary position. Such a shifting of the players is not a matter of chance. It arises from an opinion on the part of the captain or manager of the defensive team, an opinion

reasonably established from past experience, that the player who is taking his turn at the bat is likely to hit the ball farther away from the home plate and farther to the right than the average batter might be expected to do. Holding such an opinion the captain makes a forecast, that is, he "foresees the probable consequence and makes provision against it" by shifting the positions of his players before the batter has an opportunity to strike at the ball.

Getting more definitely into the field of business activity, this idea that a given set of circumstances will produce a given result enters into the vast majority of business plans, and a large share of the activities of business life take the form of providing in advance for these expected consequences. For example, the corner storekeeper, when he lays in his original stock of goods or when he adds to that stock of goods from time to time, must inevitably forecast, for at least a short period in advance, what he believes will be the demand of consumers in the neighborhood which surrounds his place of business and also what percentage of that demand is likely to seek its supply from him. As we progress into the larger and more complicated business units the absolute necessity for forecasting extends to a constantly increasing percentage of the total activities and becomes an increasingly important factor in the success or

failure of the business organization. Mistaken forecasts on the part of large percentages of the total number of business managers may in one case lead to a great over-production of certain kinds of goods with consequent business depressions and even panics, which automatically affect all lines of business activities; or if a mistake is made in the other direction it may lead to shortages and to great speculative scrambles for available supplies. In each of these cases the minority who have taken the correct forward view are the gainers, but the business community as a whole is compelled to suffer.

Similarly, in the field of investment it is absolutely impossible for any investor to escape the necessity of making forecasts. The man who buys a home for himself looks ahead with the belief that a house built in a certain fashion will last for approximately a given number of years, also that the neighborhood in which he purchases or builds will remain a pleasant one in which to reside or else if unpleasant now will show an improvement as years go on. If his forecast is wrong he inevitably suffers a loss.

When money is invested for income in stocks, bonds, mortgages or other forms of income producing property, here, as in the case of the larger forms of business, the forecast becomes a more complicated factor and the buyer must think not only of the future of the individual piece of

property in which he is buying a share, but of the general conditions which always do produce recurrent waves of rise and fall in the values of such properties in general. Here again the forecasts of the great majority are frequently wrong and we have such forms of property rising far above their true value at certain times and again falling far below their true value, thus affording opportunities in which the minority who view the future more accurately may either liquidate their holdings at high prices or replace them at low prices with very considerable profits to themselves.

When this great forecasting activity in business management and investment began to be crystallized into an organized and specialized activity it was only natural that its first appeal should be to the speculative instinct. For that reason the early history of business forecasting is largely one of attempts to make sudden fortunes through speculation in stocks or in basic raw materials. The results were highly disappointing. Scientific analysis of business fundamentals can forecast the long tides of business, but such short waves as would enable the stock market or commodity trader to make a sudden fortune have so far baffled the skill of the best business statisticians or economists.

The next development in point of time followed another instinct of human nature as

deeply ingrained as the speculative instinct, that is the instinct to seek some magic formula or method by which business success can be assured without the years of consistent effort which have always been a part of it. In this development there was a tendency to make the application of economic statistics to business forecasting a kind of fetish, just as "system," "advertising," "efficiency" or "industrial democracy" have been made fetishes by certain business men at other times. This idea produced such catch phrases as "making your business always sail with the tide," implying that it was possible to foresee great outside changes and let one's private business drift with these to easy success. Taken in this way business forecasting was again bound to be a disappointment.

It is apparent that the man who is persistently inefficient in the production of goods, the man who neglects his distributing and advertising plans so that possible customers are never brought into touch with his production, or one who neglects any of the other fundamentals of business success is not going to be able to make up the difference simply by a knowledge of such factors as coming changes in the total supply and price of raw materials, the total increase or decrease of coming demand, or the changes in its direction or in its geographical location. Other things being equal, he will have a great advan-

tage, but warning must be given against relying upon forecasting to take care of deficiencies in other fundamental qualities.

Another way of saying the same thing is that the man who is working toward success in a way sufficiently serious to warrant the use of statistics does not necessarily want to "sail with the tide." He has in his mind a definite goal toward which he wants to move, or at the very least, a definite direction in which he wants to move, and his concern with tides is very largely a matter of consideration as to what effect they will have upon his progress in the desired direction. His course may lie across the tide or even against it, but there will be a much greater certainty of arrival without disaster as well as a greater net speed if he knows what forces and currents within or without his own particular business can be used for assistance, and also what forces and currents within or without must be guarded against or allowed for in the making of his plans.

To make this abstract conception concrete let us take the illustration that the accountant's report upon a certain factory or department of a factory shows it to be operating at a loss. Here is a current with which the business manager cannot sail unless he is willing to accept the port of failure as an ultimate destination. Here is where the business statistician must begin his

work. The first operation will be called by some "an accounting operation," and by others will be spoken of as "internal statistics." Whatever the name used he will stop asking *what* and begin asking *why* and *how*.

The first step, provided the factory or department has paid in the past, would be to go back to the time when it did pay and trace through intervening weeks, months or years the tendency or tendencies which have developed, bringing it to a losing proposition. If it has never paid he will compare it with some similar one that has shown a profit. The results of this step will, of course, show as many variations as there are possible conditions to be investigated. Some of the major things that are likely to be shown are rising labor costs, rising costs of materials, falling prices for the finished product, or decreased demand, with a corresponding increase in the overhead to be borne by each unit of production.

Now we take the second step. The problem can no longer continue to be one of purely internal statistics. At this point we must discover whether the difficulty arises mainly from purely internal causes or whether it is one that has to do rather with economic changes taking place entirely without the individual establishment. To do this we enter the field of industrial group statistics and we compare the labor costs, the cost of materials, the prices realized for products

sold, the amount of products sold, or whatever those items may be in which we are most interested, with the same items for other concerns operating in the same field. If we find that the difficulty is a failure to attain the same efficiency which has characterized other organizations, then our third step, which involves "foresight of consequences and provision against them," must either take the form of some radical change within the organization itself as to personnel, methods, geographical location or whatever factor has caused a lack of effectiveness, or else we must advocate the discontinuance of the whole organization, or of some departments, in order to avoid the loss of the capital invested.

If, on the other hand, our second step shows that the difficulty confronting the individual organization which we study is one common to the entire industry, then we take a still additional step in the enlargement of the scope of our statistical study and enter the field of general business forecasting. We ask whether labor costs in general are likely to decline, and if so, how soon? Similarly, we seek to determine whether the prices of raw materials may be expected to decline, and how soon; whether it would be possible now or in the near future to increase the selling price without any marked effect upon total volume of demand; or whether a marked increase in total volume of demand

is to be expected in the future, and again, how soon?

Assuming that the particular business under discussion in our illustration has come into its losing position through factors outside of itself, the time element becomes the determining factor in deciding what course the manager should follow. If the time for improvement is very far distant he may find unavoidable overhead so high that it would pay to abandon the entire proposition. This would be a very extreme case. It is quite common, however, that the time for improvement is so far distant as to make it advisable to curtail or completely stop production through the waiting period. On the other hand, it will very frequently be found true that the time for improvement is so near at hand as to warrant a continuation of full production, knowing that the benefits of being ready to take advantage of improvement at its very earliest stages will more than counterbalance the temporary book losses of the waiting period.

The illustration which we have given for study of a business being conducted at a loss, is equally applicable to one which finds itself making abnormally high profits, except that in the latter we seek the time when the abnormally favorable factors in its operation are likely to disappear, and seek to prevent the laying of

plans which might result in disaster when the readjustment takes place.

These facts, which are applied to a business organization in its direct management, are equally valuable to the investor. A great percentage of the losses accruing to investors arises from buying property directly, or from buying securities based on a property, at a time when its apparent value is exaggerated because of conditions which soon will disappear. On the other hand, the greatest profits are obtained either by buying property directly, or by buying it indirectly through securities, at a time when its true value is apparently greatly minimized by temporary difficulties.

So far we have discussed and illustrated the use of business statistics in a general way, intending to show that it is part of normal business activity rather than any mystical formula. We may now make this more concrete by listing nine basic principles which should be kept in mind in the application of statistics to business management or to investments and speculation. These are:

- ✓ 1. The scientific use of business statistics can forecast large movements but not the small waves of price or volume fluctuations which occur from day to day, from week to week or even from month to month. For this reason it

cannot be used as any reliable basis for the sudden speculative accumulation of wealth.

✓ 2. The science of business statistics inevitably involves great research into conditions as they are and as they have been in the past, but the real object of all this research is a means to an end rather than an end in itself. The real object is to foresee what conditions will be in the future and to use these future conditions as the basis for forward looking plans.

✓ 3. Some of the forces which are measured by business statistics are those which may be classed as internal for the business itself and are, therefore, in a general way, subject to the control of the managers of the given business. Statistics of this type belong to the budgetary or management information, and the manager forecasts from them with the object of controlling the events rather than of adapting his policy to the events which they foreshadow if left uncontrolled.

✓ 4. There is a second group of economic forces measured by statistics that are, generally speaking, outside of any individual business, but are, for the most part, within some single industry. These forces cannot be controlled by the management of the individual business, though it is possible for them to be very greatly modified by concerted action among the managers of a considerable number of the enterprises in the

industry. These forces belong in the field of commercial association statistics. They may conceivably be considered factors to be controlled by cooperative movement, but, failing such control by cooperation, the individual manager must seek to foresee their effect and adjust the management of his business to those effects which he cannot change by any individual effort.

5. There are other forces measured by statistics which arise from causes that, generally speaking, are outside of any individual business or any given industry and cannot be controlled by the management of any business. These are such things as the great rises and declines of commodity prices and security prices or as general depressions or periods of general prosperity. The individual business manager or investor may join with others in an attempt to control some of these factors by cooperative effort but, so far as his individual business is concerned, he must adapt his policies to these movements rather than expect to control them. No amount of conservatism can wholly avoid the effect of these forces, and the only real protection against them is foresight based on knowledge. It is this third type of economic movement which is most commonly considered in business forecasting and will constitute the main theme of the present volume.

6. All economic happenings whether they con-

cern an individual enterprise, a given industry or the entire business world, may be divided into two types: One of these occurs at stated *periodic* intervals such as the planting and harvesting of a crop, the recurrence of elections which are fixed by constitutional enactments, or any other factor whose time of occurrence is a certainty. The other group is of the *continuous* type such as the changes in the price level or the variations in the volume of demand. In this second class of forces, variations are occurring constantly and we must be on the outlook for a change at any time.

7. The important elements in any economic movement are *direction, extent and time.* In measuring *continuous* movements such as price movements or industrial production, we may practically disregard the element of *direction*, for manifestly it can be covered by the simple formula that if the present movement is upward then the next change in direction must be downward, or *vice versa*. In other words, forecasting which only tells us that when we are abnormally high we shall eventually have a decline, or that when we are abnormally low we shall eventually have a rise, would have no practical value whatever. In *periodic* changes, such as crop production, *direction* is highly important. The matter of forecasting the *extent* of any movement is one of very great interest, whether

the movement under consideration be continuous or periodic. In actual practice, however, it must be linked with *direction* in forecasting a *periodic* movement and is approached through the *time* element in forecasting a *continuous* movement.

We have then two types of economic movement and in each of them three elements. One element (extent) is usually sought in connection with one of the other two elements. Likewise each of these other two *elements* tends to be paired with a *type* of movement. If we seek to forecast a *periodic* type of movement, then the *time* is known and we are interested primarily in the *direction* it will take and secondarily in its extent.

In seeking to make a forecast regarding a *continuous* type of movement, the *direction* being already established, we are interested primarily in the *time* when a reversal of the present direction will occur, and secondarily in the *extent* of movement which will come before that *time* is reached.

Theoretically, therefore, business forecasting should be interested equally in the elements of *time* and of *direction*. Practically the general or composite business movement and most of its component parts are of the *continuous* type, and the same is true of security price movements. Therefore the element of *time* is the

most important in business and investment forecasting.

How soon will prices which are now declining stop declining and begin to rise, or, if prices are rising how long before a decline may be expected? Similarly, how long are conditions of abnormally large or abnormally small demand to continue? When is the turn to come? These are the questions around which business forecasting must necessarily center. Many a theoretically solvent business enterprise has been forced into bankruptcy because the assets were temporarily unsalable while its liabilities were immediate. Many a business has failed to realize a justified amount of profits from expansion of demand because its managers were still thinking only of economy and contraction when they should have been preparing to take care of a demand already imminent. Similarly, investors have lost money by buying the best kind of securities just before a general fall in price or have made money by buying relatively poor securities when a general upward movement was about to begin. Usually it all comes back to the question, *when?*

8. Any given economic movement of either prices or volume of business is never the result of a single cause but of a complex number of causes which are constantly varying in intensity and of which only a part can be adequately measured by statistics. Business forecasting,

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therefore, is a matter of mathematical approximation rather than of 100 per cent accuracy. The honest statistician must confess this and the wise business manager or investor must, in applying any statistical forecast to business or investments, realize that he is only improving his foresight, not making it absolutely error proof and must be ready to consider the effect of factors which he cannot statistically measure.

9. Because one happening follows another in point of time is not sufficient proof that any cause and effect relationship exists. This is a very elementary principle of logic, but it is one of those most frequently transgressed by men who volunteer statistical information in order to influence the business or investment activities of others. Such information comes unsought to all, and one of the great purposes of really scientific statistical work is to correctly appraise such information.

All of the general principles in this chapter are discussed at greater length in later chapters, but it is well for the reader to have the concrete statement of the entire group in mind in order to understand each individual discussion as it appears in order.

CHAPTER III

BUSINESS CYCLES, SECULAR TRENDS AND SEASONAL VARIATIONS

MANY business men make the statement that they never speculate nor take chances in their business, and honestly believe they are telling the truth. A still greater number of men say the same thing about their investment operations with an equal belief that they are making an accurate statement. The word "Speculation" has come in the minds of many people to be identified with gambling operations which have for their object the accumulation of a fortune through the use of a very few dollars of capital. Used in that sense it is entirely possible for either the business man or the investor to avoid speculation, but, in the sense that he must risk his capital in operations where its total will be either increased or decreased through nationwide or worldwide movements over which he personally can exercise practically no control, every business man and every investor must take some speculative chances.

The first step toward forecasting these upward and downward movements which can be controlled neither by the individual nor, to any great extent, by a group of individuals with a common interest, is to study intensively the records of the past which must be the basis for judging the future. The accompanying chart (No. 1) shows, in one graph, the annual movement of British commodity prices from 1800 to 1924 inclusive; in another graph, the world's pig iron production by ten year periods from 1800 to 1880, and then annually through 1924; and in a third graph, the price movement of British consols by years from 1800 through 1924. These three graphs have been selected to illustrate the great movements of general commodity prices, of commodity production and of the highest grade of investment securities, as far back as reasonably accurate records can be obtained. The commodity prices are based upon the Jevons-Sauerbeck-Statist Index Numbers which constitute the longest consecutive record of a reliably computed commodity price index in existence. The world pig iron production figures are, unfortunately, not available by years back of 1880, but the general trend can be established back to 1800. The prices of British consols have been adjusted for changes in the nominal interest rate, so that the price changes shown here would represent actual increases or decreases

in the capital of an institution which might have bought them in 1800 and held them without change up to the present time. In other words, the British consols graph is actually an inverted yield.

Wherever the graphs on this chart show annual movement, they develop two distinct characteristics:

- ✓1. There is shown every few years a rise and fall which has come to be commonly called a "business cycle." These cycle movements, which occur several times during the life of each business generation, constitute the factor most important for business forecasting.
- ✓2. It will be noted that a cycle movement seldom ends at the same level as its starting point. If we consider the pig iron line, we find that each succeeding cycle tends to end at a higher point than it began, while if we take the commodity price line, we find that for long periods, as for example from 1809 to 1850, each succeeding cycle tends to end at a lower point than it began. Then for another succession of cycles as for example from 1850 to 1873, each succeeding cycle tends to end at a higher point than the preceding one. This other tendency, which persists without real change through several of the business cycle movements, has come to be called by statisticians the "secular trend."

As a subsidiary point to the characteristic of

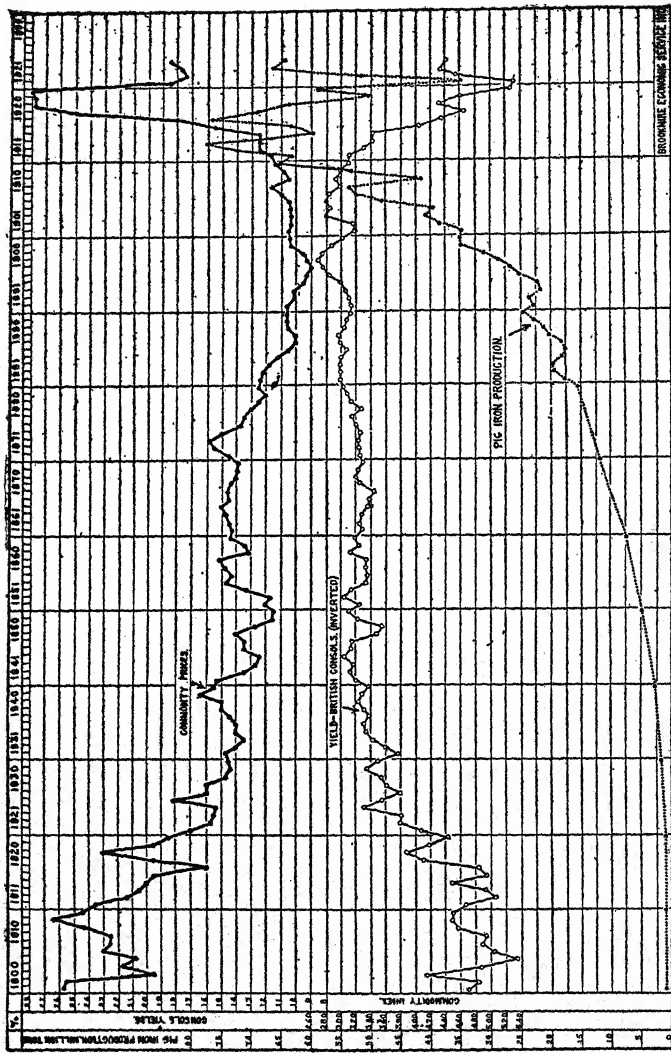


CHART NO. 1

secular trend in economic movements it is worthy of consideration that it is the price line which tends to reverse its secular trend at different periods while the pig iron line which represents actual physical production has an upward secular trend, throughout the entire period of more than a century. This is the point which has been commonly neglected by statisticians in their construction of business barometers, but it is one of the most important points for clear understanding of the principles which underlie the science of business forecasting. Every price line which it is possible to trace through a period of a century shows these reversals of secular trend in at least one or two cases, but the great majority of production lines will be found to trend upward throughout the entire period. It is also true that where the record of production of an individual commodity shows a downward tendency through a number of cycles, it is usually possible to find some substitute commodity which made an equal or greater increase. For example, the decline in the production of whale oil was attended by the beginning of production of petroleum. Another instance is that in the early years of the twentieth century the world's coal production, which had always had a steady secular tendency upward, went through the last two cycles before the outbreak of the European War without

any apparent tendency to rise further. This was compensated by an exceptional increase in the world's output of petroleum, and by an increase in the use of water power for the generation of electricity. Other great basic commodities, such as pig iron or wheat, for which no substitutes have been found, have tended to increase through each succeeding cycle for as long a time as it is possible to obtain records.

Indeed, so long as the population of the world continues increasing, it appears unthinkable that the aggregate production of physical commodities should ever tend downward or even fail to increase for a period of forty years or more as commodity prices did from 1809 to 1850, for such a movement would produce great suffering and even actual starvation. We may, therefore, state as a proven fact that statistical series which include price levels are positively subject to reversals in their secular trend, and to this fact may add a reasonably established presumption that while production of an individual commodity may tend to reverse its secular trend, the aggregate production of commodities may be depended upon to continue rising for a number of years which may, for the purposes of the business statistician, be considered as including all of the future.

An understanding of these two distinct characteristics of movement on the part of price and

production factors is an absolute essential either for the producing of a business barometer or for the intelligent use of one after it has been produced, for manifestly a high or a low price or a high or a low volume of production must be considered as such, not only in relation to the cycle movement, but also with relation to the long trend. We must, for example, consider that a certain rate of pig iron production in 1899 indicated a high degree of prosperity with manufacturing establishments busy almost to capacity, but that in 1908 an actual pig iron production nearly twenty per cent greater than that of 1899 meant a severe depression with idleness for a large percentage of blast furnaces in existence during the later year. Similarly, "low" prices at the bottom of the 1907 panic were actually somewhat higher than the "high" prices of 1899.

When use is later made of this characteristic in the construction of a business barometer, it is essential to remember further that while the trend of pig iron production has, so far as the best available records show, always been upward, there are other factors like commodity prices where this trend is sometimes up and sometimes down. For example, the "high" prices of 1890 were considerably lower than the "low" prices of 1879. Failure to consider and make allowance for these secular trends renders

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comparisons between the statistics of any two widely separated years practically valueless, and a good rule to follow is never to place reliance upon such a comparison unless one has at hand some reasonably accurate means of computing and eliminating the long or "secular" upward or downward trend.

Chart No. 1 is well adapted to showing the distinction between secular trends and the shorter movements of business cycles, but the business cycle is so small on this chart as to make it practically useless for purposes of intensive study. Actually these cycles which seem like insignificant waves on Chart No. 1 are movements which make great fortunes or wreck them. Our next step should be an intensive study of the nature of these minor movements.

WHAT IS AN ECONOMIC CYCLE?

The phrase "economic cycle" is now used by practically all economists and by a considerable majority of business men. However the general use of this term does not mean that it is used with any universally accepted meaning. Indeed it is an unfortunate truth that much of the time ostensibly devoted to economic discussions is really wasted in acrimonious bickerings between men whose conclusions are essentially in agreement, but who have assigned different defi-

nitions to the same word. A large majority of the words in the English language will be found, on the authority of any standard dictionary, to have two or more widely accepted, but basically differing meanings. It is the privilege of any man to use such a word in any of its accepted meanings so long as he makes that selection of meanings clear. But when he wastes valuable hours in fine-spun quibbling with some other man who has used the same word in a different sense, then the discussion degenerates into a nuisance which those who have the work of the world to do should not be asked to suffer.

Many of the disagreements between the supporters and opponents of cycle theories of forecasting arise from the fact that they are taking wholly different conceptions as to what constitutes an *economic cycle*. The first thing worth while, then, is to get some generally understood definition. The dictionary gives for the word cycle several different general meanings of which two could possibly be taken to fit the economic cycle.

These are:

- ✓ A—A complete course of operations returning to the original state.
- ✓ B—An interval or period of time occupied by one round or course of events recurring in the same order in a series.

Those who have applied either of these

general definitions of a cycle to the *economic* cycle have thought of it in one of three ways:

- ✓ 1. A period of time whose duration can be set in advance, so that by merely measuring the time passed since we have had prosperity we can tell when it is likely to come again.
- ✓ 2. As a series of events by which, having started from some given point of prosperity or depression, we shall, through an indefinite period of time, have equal and balancing periods of prosperity and depression returning to the same level again time after time.
- ✓ 3. An indefinite period of time during which we pass through a series of business conditions which are described as improvement, prosperity, liquidation, and readjustment. These do not necessarily bring us back to the point from which we started, but the different conditions do occur in a fixed order.

The first definition of an *economic* cycle had many adherents some forty years ago, but before the opening of the present century the essential absurdity of the idea led to its abandonment by practically all serious thinkers. It is mentioned because of historic interest, and because such well known economists as Theodore Price and H. Parker Willis still appear to consider it a sufficiently living issue to merit their hostility. It is doubtful whether one could find any recognized worker on the constructive side

of business forecasting who would defend the idea.

The second possible definition of an *economic* cycle is apparently accepted by some present day authorities on the subject but, to the writer, it seems inconsistent with facts of secular trend which have already been noted. Indeed, those who accept this definition seem to do so with the qualification that it is true only after due allowance has been made for secular trend. This qualification is not only useless; as a practical matter it is actually dangerous. Even after allowance has been made for secular trend, neither the period of prosperity nor the rising security market necessarily reaches the level attained during the preceding cycle. Likewise, neither the period of depression nor the falling security market necessarily reaches the level of the preceding cycle. All that can be accomplished by the mathematical elimination of the secular trend is to equalize the sums of fluctuations above and below the computed normal or line of secular trend. Any one cycle may reach its high or low at a level very different from that of any other cycle, and its duration may be very much longer or shorter than that of an average cycle. Because, in actual history, economic movements do have this irregularity both in time and in extent and because one who accepts this second definition is likely to be strongly

biased toward the expectation of regularity in movement, the definition is really dangerous.

The writer accepts the third definition because it describes what actually happens in business or security movements. Its acceptance admits that the problem of business and investment forecasting is more difficult than it would be if either of the first two definitions were correct, but certainly the chance of overcoming these difficulties is increased rather than diminished by an initial recognition of their existence.

ILLUSTRATION OF AN ECONOMIC CYCLE

Chart No. 2 shows by monthly positions on a larger scale the two cycles which began in 1899 and ended in 1908. Neither one of these is of extremely violent type such as we have seen during the Great War, but the first one may well be taken as representative of a mild cycle while the second shows the sharper fluctuations of a cycle which ended in a business panic. Two of the graphs on this chart, viz., British commodity prices and British consols, represent the same elements as those shown on Chart No. 1, but since it is impossible to get world pig iron production by months, pig iron production in the United States alone has been substituted for that line.

When we study the movements of a business

cycle in greater detail, it is apparent that in addition to the characteristics of cycle movement and of secular trend two other fluctuations must be taken into consideration.

- ✓ 1. There are in each of the three lines a great number of small waves from month to month,

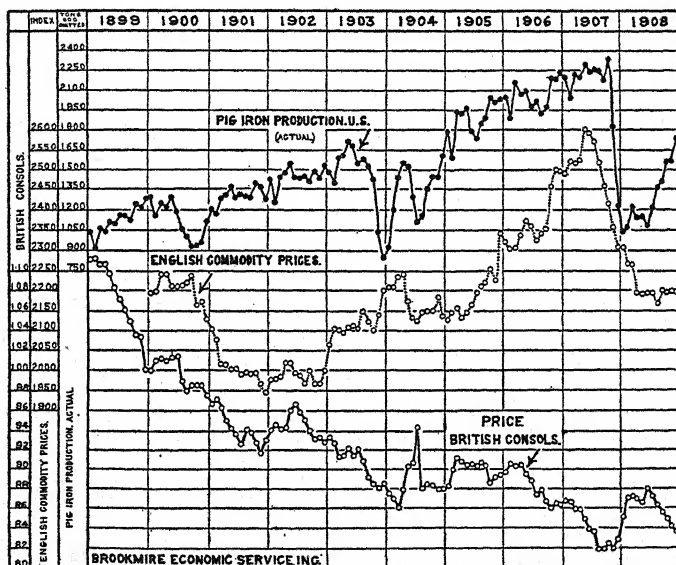


CHART NO. 2

many of them contrary to the cycle movement which is going on at the time of those months. If we used records showing greater detail they would show daily fluctuations of the same character. In the case of listed securities or commodities these fluctuations occur from hour to

hour or even from sale to sale. These are the small waves of movement for which, up to the present at least, no scientific forecasting has been possible.

2. The pig iron line shows in a marked way a seasonal variation, or tendency to reach its highest point in October of each year and its lowest point in February. This is a characteristic which depends upon the number of days in the month, weather conditions, and certain technical considerations within the iron industry itself. It is a movement which must be recognized and mathematically allowed for if any significant statistical comparisons are to be made. For example, if we seek to compare the lowest month of pig iron production in the year 1908 with the highest month in 1907 and fail to make any allowance for seasonal variations, then we shall compare October, 1907, with January, 1908, and the apparent decline from peak to trough of the movement will be 55.8 per cent. If, however, we make allowance for the seasonal variation, we find that the month of 1907, which represented the really highest pressure activity, was July, while the really low point of 1908 was January and the percentage of decline 54.3 per cent. The tendency toward seasonal fluctuation is very much stronger in some statistical series than in others. For example, on Chart No. 2 the commodity price line shows a

very much smaller seasonal variation than the pig iron line and the bond price line practically no seasonal variation at all.

It will be noted that in the months which intervened between July, 1907, and October, 1907, the real cycle movement of pig iron production, which was falling, is, in an actual record chart, concealed beneath the seasonal variation, which was rising. Similarly, Chart No. 2 also shows, as noted in an earlier paragraph, that because of the secular trend 1908 was a year of greater pig iron production than 1899, although the earlier year was one of prosperity and the later year one of depression. To get a correct judgment, therefore, of even a single cycle, we must eliminate these secular trends and seasonal variations. Chart No. 3 shows the pig iron production line with that elimination made in comparison with the actual record line, and, as a still better illustration of the necessity of eliminating seasonal variation, shows an actual record of the number of business failures in the United States through those years compared with a line from which seasonal variation and secular trend have been eliminated. This business failure record carries one of the largest seasonal variations found in the business world.

Taking the studies up to this point, the student of business statistics realizes that certain related but still distinct movements are all the

time going on in the business world. He knows that long secular trends are in operation (prac-

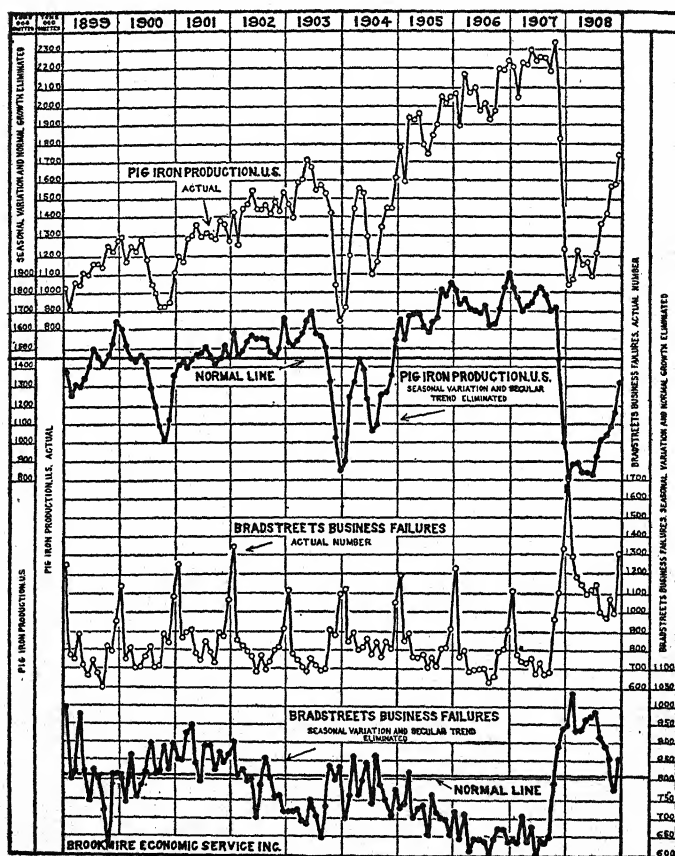


CHART NO. 3

tically always upward in the physical growth of the world, but sometimes upward and sometimes downward in price levels) which are such

long and gradual movements that, for the time involved in the manufacture and sale of any article, they may be neglected. If he is a merchant exclusively, with a more rapid turnover, this secular movement is still more clearly a matter which he can afford to neglect. But if he intends his investment in a plant or a security to be of the so-called "permanent" variety, that is to remain in one form for a considerable number of years, he must take this movement into consideration. He also knows that this long trend is broken by the cycle movements upward and downward every few years. The speed of these variations is sufficient to make it highly important that the movement should be anticipated by the merchant, the manufacturer or the investor, for it changes considerably during the period of a business turnover. He also realizes that such things as "tight" money or "easy" money, congestions of railroads or relative freedom of railroad traffic and many other factors, have a seasonal variation, independent of either the cycle movement or the secular trend, but which he can anticipate with very reasonable accuracy. Finally he realizes that there are mingled with all of these, certain monthly, weekly, daily and, in cases of active markets such as stock speculation or commodity speculation on exchanges even hourly, fluctuations which have some effect on his ultimate

profits, but which are too quick in action and are the effects of causes too superficial or too rapidly passing to permit of anticipation by statistical analysis.

He now knows the type of movements likely to happen, and comes to the important question of when such of these movements as are susceptible to reasonable anticipation will take place. The methods of determining when such movements are to take place will be discussed in a later chapter, but we may state here briefly that there are certain groups of statistical movements which constitute the advance symptoms of the beginning of either the upward or downward movement in a general economic cycle. These symptoms appear little more than a month before a turn in security prices, and usually about four to six months before a change in commodity prices and general business conditions. To state adequately the shifts of management policy required for all lines of business would be beyond the scope of any one volume or the ability of any one writer. The broader lines of such policies will be considered later, but our next step is to study the methods of anticipation of the economic movements themselves.

CHAPTER IV

THE POSSIBILITY OF BUSINESS FORECASTING— CORRELATION

IN a previous chapter we have defined forecasting as “foresight of consequences and provision against them.” In this chapter we shall center our attention upon the foresight of consequences.

To attain this foresight, in a measure that is really worth while, means that we must be able to recognize the symptoms of a coming movement in any factor by a sufficient length of time and with sufficient accuracy so that we may be in a position to make provisions against these consequences which will secure greater safety and better profits than would be possible by the routine conduct of either investment or business operations. Such a recognition is a possible accomplishment but it is by no means a simple one, and we shall be more successful in the ultimate accomplishment if we thoroughly recognize at the outset the difficulties and dangers involved.

The conditions which confront the business forecaster and which not only cause him dif-

difficulties but also may lead him to make dangerous errors have been stated briefly in Chapter I, but we may give them here in more detail.

✓1. It is possible for a given event occurring in advance of an economic result to be mistaken for one of its causes, although actually the cause and effect relationship between the two may be negligible or wholly non-existent. For this reason factors used as statistical forecasters must always have a logical connection with the result anticipated, and this connection must be sought by reason rather than by statistical manipulation. This statement should be qualified by saying that statistical tests may be used in a negative way to reject factors which logically we might consider useful, but in the positive selection of forecasting factors, reason must always lead the way to statistical tests. Possibly a clearer way to cover this entire point is to say that a business forecaster is primarily an economist and is a statistician only in an incidental way.

✓2. No economic happening such as the rise or fall of a given price or of prices in general, or the increase or decrease of volume of business in a particular line, or in general business, is ever the result of a single cause. Like causes turn like conditions into like effects, but in actual practice the conditions are never twice exactly alike.

3. Many of the causes of economic movements are not subject to accurate statistical measurement. Therefore, we can never hope to cover absolutely all of the composite of causes for even a single economic happening.

4. No similar economic happenings, such as noted in previous paragraphs, are ever the result of an exactly similar combination of causes. Therefore, even if we should determine absolutely all of the causes of some one given movement, we should not be able to make a positive cause-to-effect forecast of the next similar happening.

It is worth while to consider here the statement so frequently made that when a certain mixture of economic conditions exist, the outcome can be just as certainly predicted as can the outcome from the mixture of certain chemical elements. With the underlying idea of this statement the writer is in entire agreement, but with its implication that economic elements can be weighed, measured and mixed in isolation as chemical elements are in a test tube or in a retort, he has little patience. If we pour hydrochloric acid on a piece of zinc in a vacuum, we can forecast with one hundred per cent certainty that the result will be the formation of zinc chloride and free hydrogen. However, if we pour more hydrochloric acid on similar zinc in the presence of the ordinary atmosphere, then

the free hydrogen will be absorbed by the oxygen of the air before we can use it, and we shall have not zinc chloride and free hydrogen but zinc chloride and ordinary water.

If we carry the illustration one step further and pour another bottle of hydrochloric acid upon a heap of scrap metal, which we know contains zinc, but which we know to contain certain other metals, and which is likely to contain still other metals whose presence is not known to us, then we come to a point where the forecasting of the chemical reaction cannot be one hundred per cent accurate, and where at best, we shall be able to arrive at an approximation of what the result shall be. The mixture of economic elements which occurs in actual business life is far more like pouring the acid on the heap of scrap metal than it is like the isolated mixture made in the test tube.

Now keeping in mind the difficulties we have just set forth on the negative side of business forecasting, we may proceed to the discussion of the positive results which can be accomplished in spite of these difficulties. These results are obtained by virtue of what statisticians call "correlation" between certain economic happenings. Professor Karl Pearson has defined correlation by saying: "When we vary the cause, the phenomenon changes, but not always to the same extent; it changes but has varia-

tion in its change. The less the variation in that change, the more nearly the cause defines the phenomena, the more closely we assert the association or the correlation to be. It is this conception of 'correlation' between two occurrences embracing all relationships from absolute independence to complete dependence which is the wider category by which we have to replace the idea of causation. Everything in the universe occurs but once. There is no complete sameness of repetition. Individual phenomena can only be classified, and our problem turns on how far a group or class of like, but not absolutely same, things which we term 'causes' will be accompanied or followed by another group or class of like, but not absolutely same things which we term 'effects.'"¹

A. L. Bowley defines correlation as follows: "When two quantities are so related that the fluctuations in one are in sympathy with fluctuations in the other, so that an increase or decrease of one is found in connection with an increase or decrease (or inversely) of the other, and the greater the magnitude of the changes in the one, the greater the magnitude of changes in the other, the quantities are said to be correlated."²

These definitions were written for specialized

¹ Pearson, Karl, *The Grammar of Science*, p. 157.

² Bowley, A. L., *Elements of Statistics*, p. 316.

students of statistics, and perhaps we can simplify and at the same time make them more concrete in their application to business forecasting by a restatement as follows:

✓1. When any one given cause of a given economic happening varies, there is the same tendency (larger or smaller as the case may be) for the effect (price level, volume of production, etc.) to show a similar variation, and it is self-evident that variation in the effect must appear at a later point of time than variation in the cause.

✓2. If two economic happenings are results of approximately the same general group of causes, then there will be a tendency for a given fluctuation in one of the results to be accompanied by a similar though not identical variation in the other result. It will frequently happen that throughout a series of variations one result from the same general group of causes will consistently tend to appear at an earlier point of time than another result from this general group of causes; an example of this being the fluctuation of industrial stock prices in advance of changes in general industrial conditions. In all such cases, in default of being able to measure all statistical causes of either movement, we may use the correlation between the two results as a method of forecasting the variations in the later result.

3. If we are able to measure statistically more than one of the economic factors which are correlated with the movement we seek to forecast, then, by combining these factors in a properly weighted composite or average, we can more nearly approach a complete measurement of the variations in the entire composite of causes for the effect under consideration, and shall find our correlation improved, or, stated in simpler words, we shall be able to forecast more accurately.

These conditions surrounding attempts to forecast business or investment movements are now fairly well recognized by all who really deserve the name of scientific business forecasters, but the history of attempts at business forecasting can only be understood by remembering that many of those who have attempted forecasting have had but the haziest ideas of these fundamental principles. Even today the vast majority of investors and business executives are making disastrous mistakes in business foresight because they judge the future from too narrow an outlook, and think that because a specific cause was followed by a specific effect at some time in their previous experience, the same cause must be followed by the same effect again, and that there can be no other effect, no matter how surrounding conditions may vary.

As an historical example of confused business

forecasting we may take the "sun-spot" theory of Stanley Jevons, who holds a secure place in fame as one of the earliest scientific writers on economics, but who after discovering that certain variations in spots on the sun had been followed by variations in the crop yields of India, and these in turn by depressed business in Europe, sought to make the variations in the sun spots a forewarning of coming periods of prosperity or of depression. The sun-spot theory has disappeared long ago, but even yet we have prominent business economists, for example Archer Wall Douglas, formerly of the U. S. Chamber of Commerce, who consider crop yields as the one great cause of business prosperity or business depression. This theory hardly seems worth discussion when we remember that the panic of 1907 was preceded by an exceptionally good crop in 1906, and accompanied by the gathering of another exceptional crop in 1907, while again in 1920 the great depression was preceded by a little better than an average crop in 1919 and accompanied by an exceptional harvest in 1920. It is a fact that "other things being equal" a good crop yield would produce business prosperity. The difficulty with such pleasantly simple forecasting methods is that the "other things" rarely are equal. Therefore, one who wants to make his foresight more valuable than that which comes to the ordinary

routine business worker, must expend more labor than is involved in these superficial views of a situation, or else must secure the results of such labor from some other source.

We may take a simple example to show how correlation, together with other principles discussed earlier, would be applied to a concrete problem in economic forecasting. Let us take for our goal the making of a forecast in March of any given year to indicate the probable acreage of cotton that will be harvested in continental United States during the months of the following fall.

The changes in cotton acreage constitute a "periodic" rather than a "continuous" movement, in that there is bound to be one change and no more in each year. Therefore (principle 7, Chapter II) we may disregard the Time element in this instance. But whatever period of years we choose for a sample, we find that, over any stretch long enough to be truly representative, the number of increases and decreases are approximately equal. Therefore, it is highly important to forecast Direction. The extent of fluctuation from the previous year has varied from 0.4 per cent to 15.7 per cent, so that the extent of fluctuation is also a factor of real importance. To get a concrete conception of our problem let us examine the twenty-four years from 1901 to 1924 inclusive. We find that one

who in each March based his business policies upon the assumption that cotton acreage would be the same as that of the preceding year would have missed his calculation by an average of 8.3 per cent, and that in one year (1906) he would have been wrong by 15.7 per cent. We know in advance that some of the factors causing these variations in acreage cannot be statistically measured. For example, in March of any year we cannot tell what effect variations from the average of weather conditions are going to have upon planting and upon subsequent abandonment before harvest. For that reason we may restate our goal by saying that we shall seek to make our forecast average more nearly accurate than 8.3 per cent and more specifically, since the larger errors are the ones most harmful in forward looking business plans, we shall seek to reduce the greatest error from 15.7 per cent.

Our first step then is to seek, by a study of the field, those factors which influence the cotton planter in either increasing or reducing his acreage. We have already rejected weather conditions, for they cannot be known when the forecast must be made, and for the same reason we must reject all price fluctuations or other conditions which occur after March first.

Probably the most prominent factor in the discussions of cotton acreage by cotton planters, and by business men and bankers of the cotton

belt, is the price at which producers have been selling their previous crop. We may, therefore, take for our first approximation a correlation between variations in the average spot cotton prices for the five months October to February of each cotton year from those of the preceding year. Working out this correlation mathematically we get the indicated percentage changes shown in column No. 2 of the accompanying table,¹ while column No. 3 shows for each year the spread existing between this March forecast and the actual results as reported by the Department of Agriculture which are shown in column No. 1 of the same table.

Summing up the improvement which this first correlation makes in our forecast of the cotton acreage to be harvested, we find that on the average we have missed the actual result by only 5.1 per cent as against 8.3 per cent for the man who makes no forecast at all, and more important still our greatest error in any single year has been reduced from 15.7 per cent to 13.6 per cent. This illustrates the principle that variations in one of the causes tend to produce similar variations in the effect, but at the same time it remains apparent that variations in the effect are very far from being identical with those in this single cause. We may now go further by introducing a second cause.

¹P. 68.

The next factor worthy of consideration is that changes in the cash price for cotton do not always represent the actual changes in purchasing power of the cotton producers. Variations of general commodity prices in the opposite direction from cotton prices will accentuate the change in purchasing power, while changes in the same direction will decrease it. If a small variation in cotton price is accompanied by a larger variation in the average of commodity prices in the same direction, then the real change in cotton purchasing power may be entirely reversed.

It is also true that when other prices are rising the cotton planter himself and his labor will be more likely to turn to other production where profits and wages may be rising. Conversely, when general commodity prices are falling they will be more likely to turn back to cotton production. The second factor to be introduced in our composite then is the relationship between the price movement of cotton and Bradstreet's commodity-price average. Taking the composite of these variations and of the spot cotton prices used in the first approximation, we come to the second approximation shown in column No. 4 of the table with the resultant errors shown in column No. 5. We now have an average error of 4.4 per cent with a greatest single error of 11.8 per cent. This illustrates

the greater degree of correlation as we increase our number of factors. Without taking each separately, we shall add still more.

Other items which logically appear to be correlated in the variations of the cotton acreage, and which prove to have such a correlation when statistically tested, are: (1) The amount of cotton still carried in the hands of producers in March; (2) The tendency for a year of exceptionally high increase or decrease to be followed by a movement in the opposite direction; and (3) The secular trend to increase acreage. When all these three factors have been introduced into our composite for correlation, we come to the final [fifth] approximation which reduces the average error to 3.6 per cent and the greatest error for any one year to 10.5 per cent.

In taking this illustration of the forecasting of the cotton acreage, selection has been purposely made of an instance in which the importance of those factors which cannot be statistically measured is readily apparent to the casual reader. We have already spoken of the error which must necessarily be introduced through inability to take into consideration variations in the weather conditions which are still to come when the forecast is made. It is, therefore interesting to note that of the two cases where the error of the forecast exceeds

COTTON ACREAGE FORECASTS 1901-1924

	PER CENT CHANGE IN ACTUAL ACREAGE HARVESTED	APPROXIMATION No. I		APPROXIMATION No. II		FINAL APPROXIMATION	
		Expectation	Error	Expectation	Error	Expectation	Error
1901.....	7.1%	+ 6.9%	0.2%	+ 9.9%	2.8%	+ 8.3%	1.2%
1902.....	+ 1.5	- 4.1	5.6	- 5.3	6.8	+ 1.3	0.2
1903.....	- 0.4	+ 1.7	2.1	+ 0.6	1.0	+ 0.5	0.9
1904.....	+ 15.4	+ 10.3	5.1	+ 13.1	2.3	+ 12.5	2.9
1905.....	- 13.1	- 7.5	5.6	- 9.3	3.8	- 14.2	1.1
1906.....	+ 15.7	+ 7.1	8.6	+ 7.8	7.9	+ 14.0	1.7
1907.....	- 5.5	- 1.0	4.5	- 3.2	2.3	- 2.7	2.8
1908.....	+ 9.4	+ 1.5	7.9	+ 3.9	5.5	- 3.3	6.1
1909.....	- 4.6	- 4.2	0.4	- 4.7	0.1	- 3.9	0.7
1910.....	+ 4.7	+ 12.9	8.2	+ 11.4	6.7	+ 9.5	4.8
1911.....	+ 11.2	- 0.1	11.3	+ 0.8	10.4	- 8.4	10.5
1912.....	- 4.9	- 7.8	2.9	- 5.9	4.9	- 7.6	3.5
1913.....	+ 8.2	+ 6.6	1.6	+ 3.2	2.3	+ 2.7	0.6
1914.....	- 0.7	+ 1.4	2.1	+ 12.4	2.3	+ 18.1	3.4
1915.....	- 14.7	- 9.9	4.8	- 10.7	0.7	- 17.6	3.4
1916.....	+ 11.4	+ 14.3	2.9	+ 4.3	7.6	+ 3.8	7.1
1917.....	- 3.3	+ 10.3	13.6	+ 8.3	1.9	+ 6.9	0.5
1918.....	+ 6.4	+ 15.7	9.3	+ 0.9	5.9	- 9.3	2.5
1919.....	- 6.8	- 0.1	6.7	- 4.0	2.9	+ 6.9	0.0
1920.....	+ 6.9	+ 6.4	0.5	- 8.0	7.0	- 23.6	8.6
1921.....	- 15.0	- 12.3	2.7	- 5.3	3.0	+ 14.6	6.3
1922.....	+ 8.3	+ 0.6	7.7	+ 0.6	11.8	+ 4.4	8.0
1923.....	+ 12.4	+ 9.4	3.0	+ 8.4	3.0	+ 7.2	4.2
1924.....	+ 11.4	+ 6.7	4.7	.....	4.4	.....	3.6
Average Error....	.....	.....	5.1	.....	.....	.....	.....

8.3 per cent one occurred in 1911, a year of exceptionally favorable weather conditions, while the other occurred in 1921, when the original government estimates were so far away from the truth as to necessitate a great revision after the crop year was over. Even now it is doubtful whether the apparent error is in the government estimate or in our estimate. Another large error came in 1917, when mobilization of possible laborers kept acreage heavily below the estimate. Such an error as that of 1911 could not be avoided by any statistical correlation, nor could it be predicted by human judgment, but the 1917 error illustrates the necessity of keeping awake to the importance of factors which cannot be included in any correlation formula which is to extend over a large number of years, because in most years these conditions do not actually occur.

In 1921, when the Department of Agriculture made such a great mistake in its forecast, a prediction based on this method and published March 21,¹ placed 8,500,000 bales as the probable crop (an error of only 523,335 bales) while the government estimate, published October 1st, carried an error of about 2,000,000 bales.

It will be noted that the writer does not believe that all important economic happenings can be forecast from one general statistical

¹The *Brookmire Forecaster*.

barometer. There is a general business cycle which cannot safely be disregarded in any specific forecast of an individual commodity price or any other particular economic happening. Construction of a barometer for that general cycle involves Time considerations rather than Direction of variation, and its construction is somewhat more complicated, but the underlying principle of correlation is the same. In the meantime it is well to illustrate with this simpler barometer, both because its simplicity gives an easier grasp of basic principles, and because it shows the value of specialized efforts as against all-inclusive forecasts from the inadequate basis of a single general barometer.

Summed up then, there are serious difficulties in the way of making any forecast of business conditions from a statistical basis, and such difficulties make 100 per cent accuracy in forecasting an absolute impossibility. On the other hand, when these difficulties are intelligently recognized, it is possible through correlation to use a statistical basis as a tremendous aid to human judgment in such foresight of the coming economic consequences as will permit highly advantageous provision against them.

CHAPTER V

CONSIDERATION OF GENERAL BUSINESS BAROMETERS

IN the previous chapter we discussed the possibility of business forecasting through correlation and illustrated it by the compilation of a statistical device for forecasting a specific economic happening, namely: the variations in cotton acreage. Such devices which aid in the foresight of coming economic conditions are called "barometers" by an analogy with the physical barometer which is used as an aid in foresight of coming weather conditions. In the present chapter we shall take up the subject of statistical "barometers" for general business conditions. In this use of the word "general" we do not mean to include the forecast of all economic developments from a single basis, but rather use it in the sense that instead of some narrowly specific thing such as cotton acreage, we are seeking a "barometer" which will aid us in forecasting the average tendency of a great many specific factors, such as a general average of commodity prices. The specific illustration

which we shall use is a "barometer" correlated with Bradstreet's average of commodity prices.

This average which we seek to forecast is of the "continuous" type as distinguished from the "periodic." We may, therefore, dismiss the factor of direction with no particular attention, because, as explained in Chapter II, when a continuous factor is rising it becomes axiomatic that its next change of direction must be downward, or when it is falling it is equally axiomatic that its next change of direction must be upward. The factors on which we shall concentrate our attention are *extent* of movement and *time* when change of direction may be expected. We may say in advance that the extent to which prices will rise under favoring conditions is limited only by the point where money would become absolutely worthless. Similarly, no way of estimating the limit of the fall is available except by the mathematical limitation of zero. For that reason the factor of extent of movement will be approached entirely through the handling of the *time* element.

When we approach the problem of selecting and arranging those economic factors which are correlated to the great upward and downward movements in stock prices, and in average commodity prices, we are by no means working in a virgin field. Jevons did not succeed in establishing any relationship between the "sun spots"

and business changes, but he did start a line of thought which has never been completely abandoned.

Men have constantly studied and written in a more or less loose way of the causes of panics and of prosperity, and more than forty years ago Benner had evolved the theory that, whatever the causes of these fluctuations might be, they tended to reproduce themselves after a fixed number of years. His idea was as grotesque as that of Jevons and produced equally worthless results. But from the opening of the twentieth century we have seen various business barometers brought forward which have been of real use in a practical way, and which contain suggestions for any barometer that may ever be constructed in the future.

Generally speaking, these twentieth century barometers fall into two great groups. The first of these groups carries over into the field of economic analysis the fundamental physical law that "for every action there is always opposed an equal reaction." The one barometer in this field which has become well known is that of Roger W. Babson. Mr. Babson's barometer statistically measures the extent to which business conditions are favorable (that is above normal) for any period of time, then multiplies that favorable position by the length of time for which it exists and makes as his fore-

cast a statement that the product of these two factors, time and intensity, on the favorable side of the line must inevitably be balanced by a period of depressed business, in which the product of the time and intensity should equal that of the preceding expansion. No claim is made that a period of expansion will have an area equal to that of the preceding area of depression and, apparently, the Babson Chart is not intended for use in forecasting the end of such a period. The chart originating from this method is shown on the accompanying cut (Chart No. 4, page 76), with the author's own explanation of its use.

There is little doubt that the fundamental theory underlying Babson's composite plot is an accurate one from a purely academic point of view. It has two great weaknesses as a practical forecasting device: (1) the X-Y line is of such irregular shape that an area, as for example, Area F, may be reduced by fluctuations in this X-Y line to approximately half of what one would have expected at the time he was passing through Area E. This weakness, which is due to the attempt to use the secular trend of commodity price factors,¹ caused this chart to lose its significance during the war inflation. (2) Frequently little advantage can be gained from this chart in seeking to approximate the

¹ See Chapter III, p. 39.

time element of any business movement. For example, in 1907 at the completion of Area B, Area C developed immediately; on the other hand, Area D was scattered along through the years 1910-11-12, and even a part of 1913, and, although the chart would seem to indicate that Area E should develop in 1911, or at least in 1912, it did not begin to occur until the second half of 1913. For practical use such hazy approximation of the time element cannot be of very much value. In fairness to Mr. Babson, it should be stated that he does not claim any forecasting value for this chart.¹

The author of this barometer seems to have paid no attention to the theory of correlation in the construction of his barometer, and, as a matter of fact, in no part of his published work does there appear any recognition of such a theory. His work is, therefore, decidedly set apart from that of the remaining economists who have suggested or constructed another group of forecasting devices which make use of the sequence of various events, so that those occurring at an earlier date could be used as forecasters of those which occur later. (See Chapter IV.)

In this second group we may mention the theories of Professor Irving Fisher. Although he has not constructed a forecasting device or

¹ Address Am. Stat. Assn., April 17, 1925.

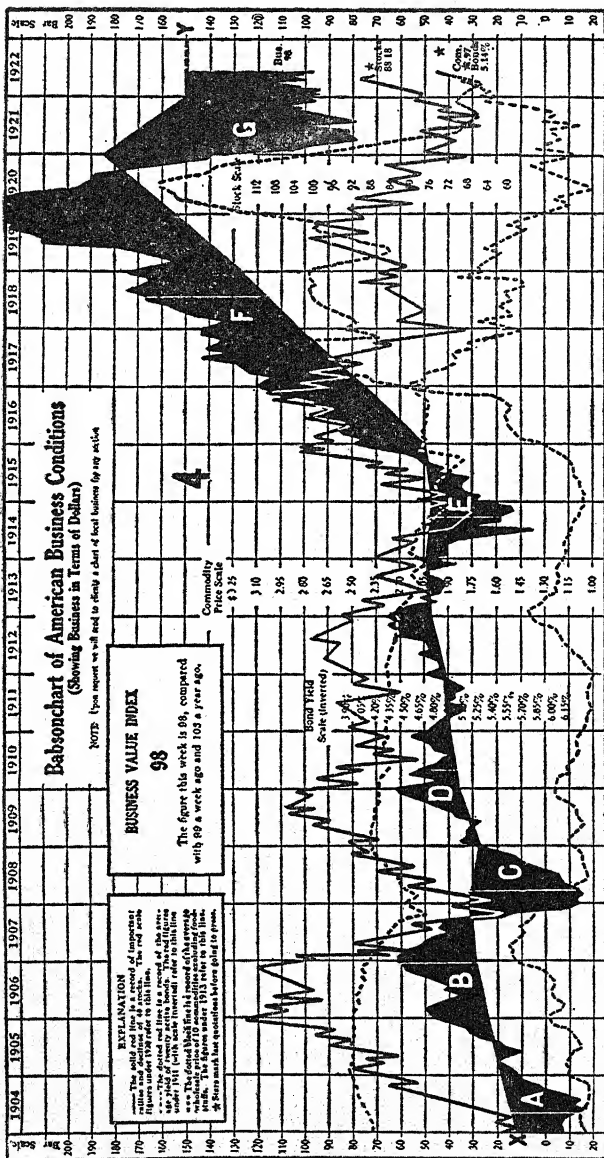


CHART NO. 4

EXPLANATION OF THE BABSON CHART

The large shaded areas are formed by combining and plotting the Statistical Sheet figures. The subjects used are New Buildings, Crops, Check Transactions, Immigration, Total Foreign Trade and Money (adjusted scales), Failures, Commodity Prices, Railroad Earnings, Stock Prices. An index of Canadian business conditions is also included. These subjects combined give a Babson chart of business in America. When Interstate Commerce reports for all United States railroads became available, January, 1909, this record was substituted in place of the earnings of ten representative roads which had been used previous to that time. Revised scales were also introduced for monetary figures August, 1912. Bank Clearings were used from 1904 to 1913, inclusive, after which Check Transactions were substituted therefor.

The line X-Y represents the country's net gain or growth. Based on the economic theory that "action and reaction are equal" when the two factors of time and intensity are multiplied to form an area, the sums of the areas above and below said line X-Y must, over sufficiently long periods of time, be equal, provided enough subjects are included, properly weighed and combined.

It will be seen that each area is divided into halves by a narrow white line. This is to emphasize the fact that the first halves of Areas A, C and E are really reactions from the extravagance, inefficiency and corruption which existed during the latter half of the preceding "over-expansion" area. Contrariwise, the first halves of Areas B, D and F are really based upon the economy, industry and righteousness developed during the hard times just preceding.

The high points of the stock market have come in the early part of the over-expansion areas and the low points have come about the beginning of the depression areas, although in 1914 the war held prices of both stocks and bonds down longer than usual. Low money rates and high bond prices have usually come about the end of the depression areas and high money rates and low bond prices at about the end of the over-expansion areas.

The slope of the line X-Y must always be estimated for the current year and is thus shown *dotted and undetermined* for 1922. After the close of 1922, however, we shall know better what its slope should be and will then indicate it by a solid black line.

ever attempted any continuous forecasting of economic events, Professor Fisher in his discussion of the quantity theory of money constructed an algebraic formula "The Equation of Exchange." The equation is $MV + M^1V^1 = PT$. In this equation the M stands for the amount of circulating currency in any given country, V the velocity of its circulation, M^1 the amount of bank credits subject to check and V^1 the velocity of circulation of such credits. P represents the average price at which commodities, securities and services are bought and sold, and T the quantities of such commodities, securities and services multiplied by the number of times they change hands. A full explanation of this equation would involve a long discussion of both economic theory and mathematical computation. For our purpose it is sufficient to know that in his statistical studies Professor Fisher established the fact that the V and V^1 of his equation tended to make their highest points a few months before the decline in price levels, and that, conversely, they tended to make their lowest points shortly before rising price levels. This conclusion, although a by-product of his investigation along different lines, is one of the most valuable contributions ever made to the science of business forecasting.

When we come to the matter of actual barometers constructed on the basis of the correlated

sequence of different economic events, the oldest and best known is that constructed by James H. Brookmire. Mr. Brookmire believed that in each cycle of business the economic happenings tended to occur in an orderly sequence and that they might be roughly classified into three great groups: (1) Banking factors; (2) Speculative factors which he represented by security prices; (3) General business factors including both commodity prices and physical volume of business. Mr. Brookmire constructed a Barometer Chart of the United States (See Chart No. 5, page 80) from which he made forecasts using the theory that when the banking factor started either a major rise or a major fall, it would be followed in a few months by security prices and still a few months later by general business conditions. In addition he constructed a chart showing European banking movements and commodity prices of England. This chart was used as a check upon the conclusions from the Barometer Chart of the United States, because good conditions and bad conditions in Europe always have some corresponding effect upon business movements in America.

In its treatment of the time element this Brookmire Chart represents a long advance over the ones previously constructed, in that its sequences occur within some five or six months of each other. However, even in theory it had

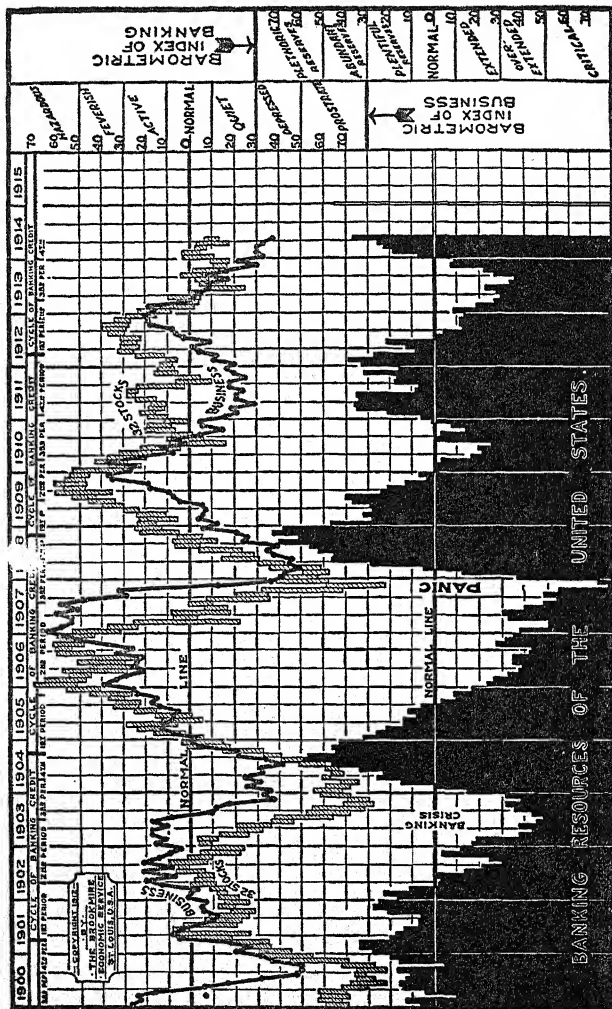


CHART NO. 5 OLD BROOKMIRE BAROMETER

the radical objection that each of the two forecasting factors is subject to minor upward and downward monthly movements which have absolutely no significance for forecasting purposes, but which cannot be distinguished from the significant major movement turns until several months after they have first appeared on the chart. In actual practice this chart developed a further weakness because of the fact that it attempted to compute in advance the normal lines of economic factors which contain commodity prices. As noted in Chapter III the normal lines or secular trends of these factors frequently reverse themselves or make tremendous changes in their rate of movement. For that reason this chart lost its significance during the great inflation period of the European War of 1914-18, and although its valuable qualities have been recognized and used in later charts, it has been relegated to a minor position by the Brookmire Economic Service.

The barometer prepared for the Harvard University Committee on Economic Research, under the direction of Professor Warren M. Persons, is, so far as its general forecasting principles are concerned, closely similar to the chart made by Mr. Brookmire. At one step of his work Professor Persons divided the economic movements of a cycle into five groups instead of

the three used in the Brookmire Chart,¹ but when he came to the actual making of the business barometer those five were again condensed into the old Brookmire three "Banking," "Speculation," and "Business." (See Chart 6, page 83.) The likeness of the Brookmire and Harvard Charts is somewhat obscured by the fact that the Harvard Chart starts the cycle with Speculation and closes with Banking, while the Brookmire Chart starts with Banking and closes with Business. But as each cycle must follow in chronological order and merge into the other, this difference is one of form rather than of substance. In other words, what Professor Persons calls the last movement of any given cycle is what Mr. Brookmire calls the first movement of the succeeding cycle.

The Harvard Barometer, since it follows the same forecasting method as the Old Brookmire Barometer, naturally has developed the same weaknesses. There is the same impossibility of distinguishing a minor fluctuation in any given month from a change in major trend in one of the graphics. There has been the same loss of forecasting significance in its graphics during the war inflation period, and there will always be the same danger that the barometer will again lose its significance in case of a sharp change in the trend of commodity prices.

¹ *Review of Economic Statistics*, April, 1919, p. 129.

(C) Banking.

1903-14 AND 1918-20

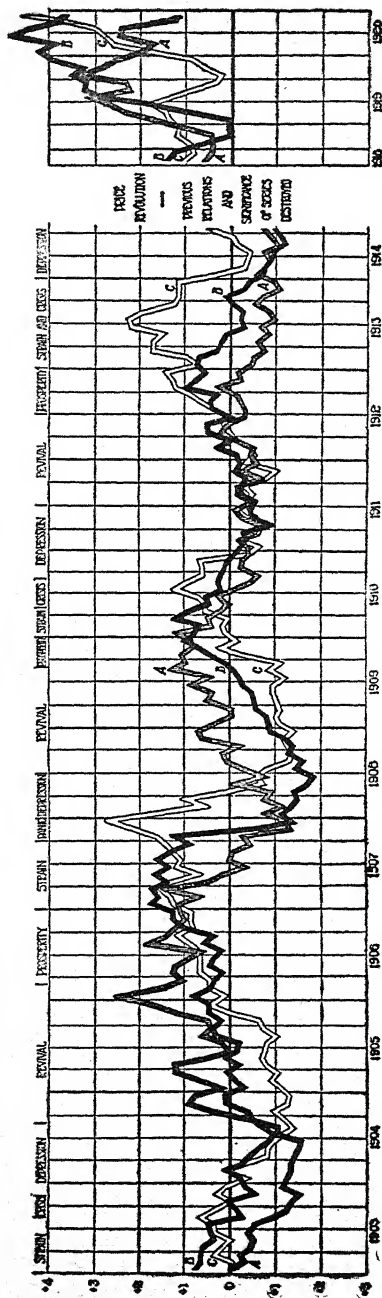


CHART NO. 6

(Reproduced by permission The Harvard Committee on Economic Research.)

It may be objected that this failure occurred under extraordinary conditions, but it seems to the writer far more important to forecast accurately under extraordinary conditions than under ordinary ones. A barometer which forecasts the mild movements of 1910-13 but ceases to function from 1914 to 1919 inclusive may be interesting for an academic discussion but the man engaged in business or actually investing his money has no such easy way of escape. To him that barometer will actually give a false reading and will be as dangerous as a ship's barometer which after successfully warning of several thunderstorms should leave the navigator unwarned in the face of an East Indian typhoon.

The announced purpose of the Harvard Committee on Economic Research was to "promote the collection, criticism, and interpretation of economic statistics, with a view to making them more accurate and valuable than they are at present for business and scientific purposes." While it has not succeeded in bringing forward any new general principles of forecasting, its work has made a significant advance in the application of refined statistical methods to economic data. Discussion of those statistical methods would be both too bulky and too technical for any volume intended for the general reader, but mention is made here by way of

acknowledgment that use has been made of these methods in the barometer later presented, and the work of the committee is recommended to those who wish to become expert on the technical side of economic statistics.

A more recent attempt at the construction of a forecasting barometer for public use is the one of Col. Leonard P. Ayres. In two respects Colonel Ayres brings his result closer to the principles outlined in the previous chapter than does any one of the other men whose work has been discussed.

1. He realizes that one chart can not be used to cover an entire economic situation.

2. He adopts the principle brought out by the writer in 1920, that the most useful forecasting factors are those whose significance changes with the crossing of some basing line rather than those whose significance changes at the crest or the trough of their movement.

On the other hand, he does transgress the fundamental principle that no great economic change is ever the result of a single cause or can be successfully correlated through a great number of cycles with a single other happening. For example, Colonel Ayres attempts the forecasting of bond price changes from correlation with fluctuations in the production of pig iron in the United States alone, in any given month. The formula is pleasantly simple. It is that the high

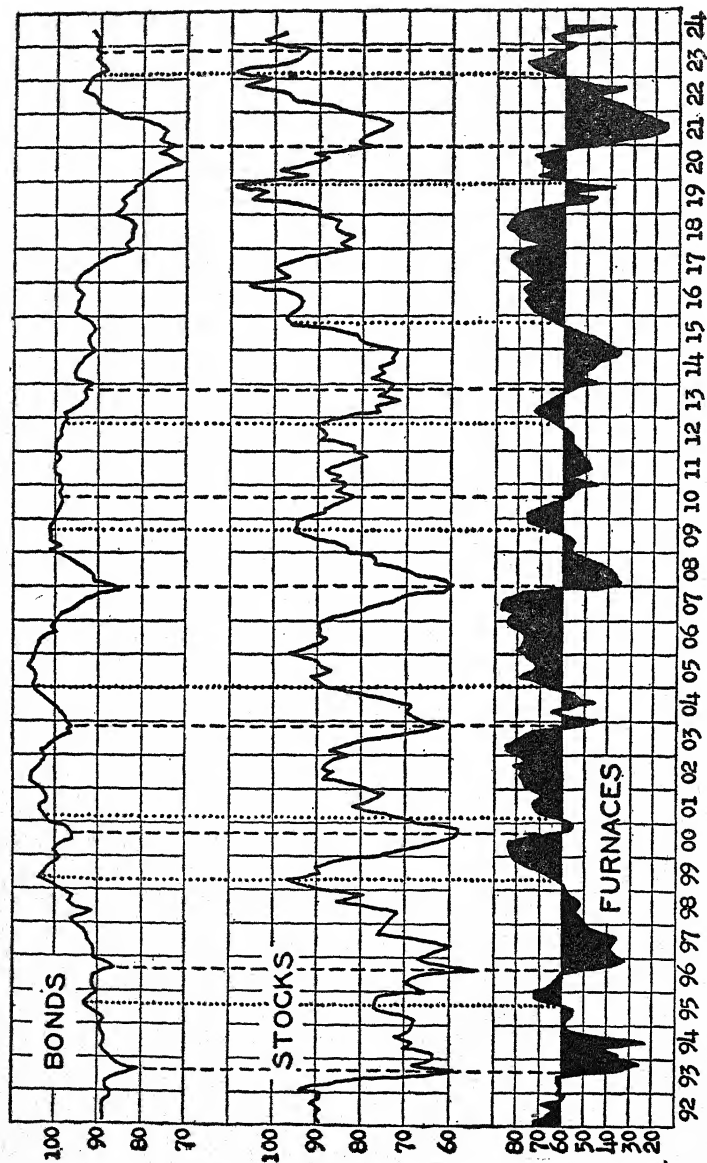


CHART NO. 7

(Reprinted by permission from *The Cleveland Trust Company Business Bulletin*. Vol. 5, No. 7.)

COLONEL AYRES' EXPLANATION OF CHART NO. 7

An "important lesson to be drawn from it is that bond and stock prices tend to move in cycles together, and not with bond prices leading and stock prices lagging, as has been generally believed. In spite of minor exceptions, it is evident from the diagram that stock and bond major movements tend to have their tops and bottoms synchronously, one with the other."

Another "important deduction is that the dominant factor in determining the course of stock prices, as well as bond prices, appears to be current interest rates, and not the discounting of future business prospects which has long been held as the determining factor in stock market swings. When industry falls below normal, interest rates decline and bond prices rise, and so do stock prices. The influence of easy money rates is cumulative, and so long as they decline security prices of both sorts tend to advance. When industry recovers to normal, money rates begin to advance and security prices to fall."

point for bond prices in any given rise will come fourteen months after the low point in the preceding depression of pig iron production, and that the low point of bond prices in any given decline will occur eighteen months after the high point of the preceding expansion of pig iron production.

When this study was issued in 1922, it was assumed that pig iron production also forecast stock price changes, but later (1924) Colonel Ayres published a chart (No. 7) attempting to demonstrate that both stocks and bonds would fall whenever more than sixty per cent of the pig iron blast furnaces in the United States were active at one time. Conversely, when less than sixty per cent of such furnaces are active, he stated that both stocks and bonds would rise. This chart is reproduced in Chart No. 7, and its author's explanation is on the opposite page.

Still more recently (1925) Colonel Ayres has stated that stock prices will always fall when the sixty-day collateral loan rate in New York is above the yield on high grade bonds and that these prices will rise when the reverse is true. This chart, with its author's explanation, is reproduced in Chart No. 8.

Colonel Ayres' work shows good results, but in each individual case it is fundamentally weak because of its reliance on a single correlation. In practice, it makes the usual small errors which

no forecasting device can ever hope to escape, and, in addition, others which are traceable directly to its faulty basic principle. These errors may be classified into two groups:

1. Small, almost accidental, errors due to fluctuations which have no fundamental significance. Such errors occur, by the first method, in 1892, 1904, 1919 and 1924. By the second method they occur in 1891, 1896, 1900 and 1917. They do not cover much ground and the theoretical objections to them seem trifling. However, anyone who has tried to follow a consistent policy of buying and selling securities will realize that this matter of shifting to the wrong side for several months and then changing back without any genuine change in fundamentals is a great practical handicap.

2. Great and costly errors due to an inadequate covering of the field. The worst error of this type occurs, by both methods, in 1919, when one of the great bull markets was completely missed, as it was by most forecasting methods. Other serious errors of this type occur by the first method in 1901-02, 1905-06 and 1916. By the second method such errors occur in 1895, 1901-02 and 1916.

The distribution of the errors made by these two forecasting devices, both the work of the same economist, offers not only an opportunity for constructive criticism of Colonel Ayres' work,

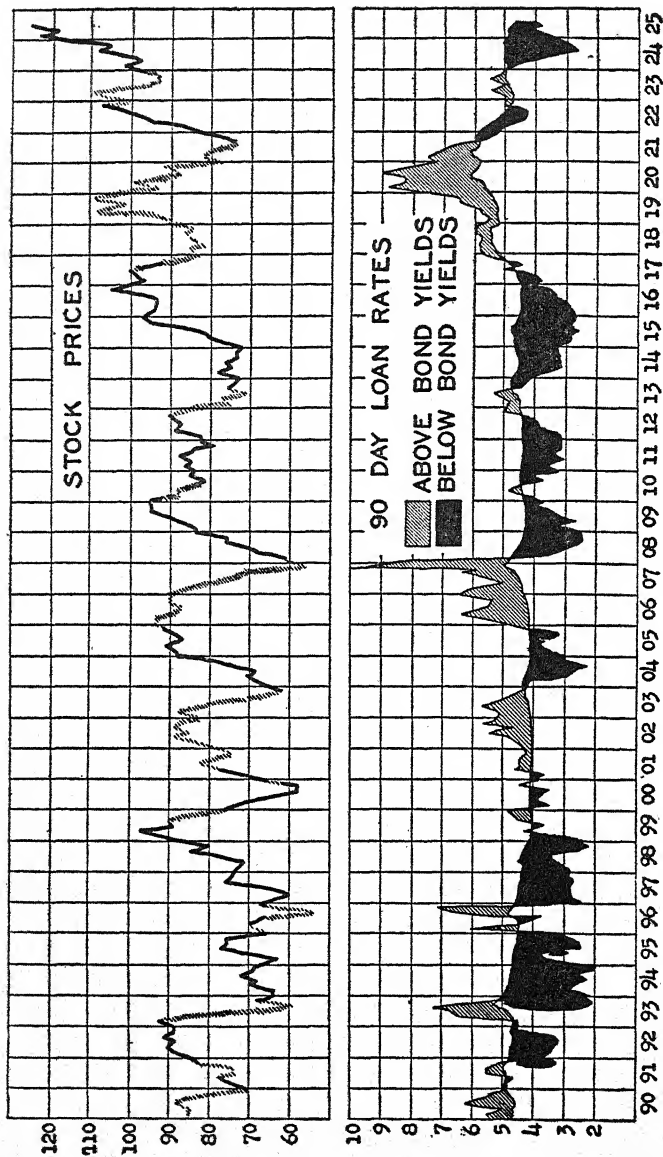


CHART NO. 8

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COLONEL AYRES' EXPLANATION OF CHART NO. 8

"The diagram" on the opposite page "shows in the upper section the course of the average prices of industrial common stocks over the past thirty-six years. The bottom portion shows the course of two kinds of interest rates over the same period of time. The outline of the silhouette is formed by the line showing the course of the rates on ninety-day loans in the New York market. The dividing line between the portions of the silhouette that are in solid black and those parts that are shaded is the line showing the changes over this period of the yields on sixty high-grade bonds.

"The ninety-day loan rate shows the fluctuations in the kind of short time interest that is most representative of the fluctuating costs of credit extended to brokers for carrying security holdings. The bond yield line shows the changes in long term interest rates.

"The fluctuations in the short time interest rates are far greater than those in the long time ones, and over a period of years the short money rates alternately rise above and fall below the long money rates. In the lower diagram the shaded surfaces represent those periods in which the short time rates were above the long time ones, and the surfaces in solid black show the periods in which the short time rates were below the long time ones.

"The line showing the stock prices is in solid black during those months covered by the black areas in the lower part, and it is in shaded sections over the months covered by the shaded areas in the lower portion. The general rule has been that stock prices have risen during the periods that the ninety-day loan rates were lower than the yields on long time high grade bonds, and they have fallen when the loan rates were higher than the bond yields."

but also a fine illustration of the path which must be followed in the improvement of forecasting methods. In the first place, it is apparent that Colonel Ayres could make a great improvement in his results by the simple expedient of combining his two methods into a composite. No two of his minor errors occur at the same time. Therefore, a composite of the two charts would have a tendency to eliminate all of these. Whether a weighting could be so devised as to eliminate all of them in a composite of only two factors is an open question, but it serves to illustrate how a composite of a greater number of factors does eliminate practically all of these minor errors.

Even in the case of the major errors a composite of the two would show considerable improvement in the years 1895 and 1904. The improvement illustrates the advantages of the composite method while the continued errors of 1901-02, 1916 and 1919 merely prove that Colonel Ayres' research work is still a long way from an adequate covering of the field.

So far we have found weaknesses in each of the barometers described, but this should not be taken as an inference that they do not have points of strength. The business public has had its confidence in economic statistics weakened by the tendency of each new writer on this subject to seek unjust enhancement of his own

reputation through an unjustifiable minimizing of the value of the work done by others in the same field. The automobile designer of 1925 has made great progress over designs turned out in 1910, but his ultimate result is influenced by his knowledge of what has been done before in the field and represents a part of a steady advance rather than a revolutionizing of the entire field of automobile engineering. Similarly, the business barometer which will be presented later in this chapter has been influenced by all of the others described and by the work of many unmentioned economic statisticians. An effort has been made to strengthen the weak spots that have become apparent in the previous work, but it is hoped that succeeding years will see some great advances over the results presented here.

The relationship of the barometer to be presented here to those already described may be summed up as follows:

1. The effort to construct a single forecasting device for all business and economic changes is abandoned because, while such a barometer can be made to show a certain appearance of accuracy, the time sequence of those movements varies so greatly as to seriously impair its practical value. For example, while it is true, as stated by the Harvard Service that *on the average* an upward or downward swing of industrial stock prices has been followed by a corre-

sponding movement of commodity prices seven months later, it is also true that the period of lag in the sequence is rarely an exact seven months. The period has varied from fourteen months (1906-07) to no lag at all (1923). Indeed in 1916-17 there occurred a major falling movement of stock prices which carried the industrial stock average downward approximately forty-four points without any corresponding movement whatever in commodity prices or in general business conditions. This, of course, occurred under extraordinary conditions but, as previously stated, it is more important to forecast accurately under extraordinary conditions than under ordinary ones.

2. The theory of action and reaction is discarded here in favor of the method of correlation among economic movements having a time sequence (what Professor Persons calls a "lag"), because this second method has shown much better results in approximating the *time* when major changes occur.

3. Professor Fisher's suggestion regarding the speed of turnover of money and banking deposits is used in a modified form, but it is combined with other factors, because, as noted in Chapter IV, its use alone would afford too narrow a basis of judgment.

4. The tendency of the Babson Chart, of the old Brookmire Chart and of the Harvard Chart

to lose significance in a period of inflation and deflation is minimized by avoiding the use of any factor into which price enters as a single element; that is, for example, the bank clearings of any city or the country as a whole can not be used as a forecasting factor for they are influenced by changing price levels, but the ratio between bank clearings and bank deposits can be used as a factor since the movements of the two sides of this ratio are in the same direction during a period of inflation or of deflation and the ratio remains unaffected.

5. Instead of using forecasting graphics made up of homogeneous series such as Banking, Speculation and Business, approximation has been improved by including in the forecasting graphic all available factors correlated with the specific movements we seek to forecast. The reasons for this are more fully given in Chapter III.

6. History shows that when a major commodity price movement is rising its momentum will carry it upward until fundamental conditions become decidedly worse than normal; that when a major commodity price decline has started it will persist until conditions become at least as favorable as normal. Price records appear to indicate that this tendency is present during periods of secular decline in commodity prices as well as during periods of secular rise.

The basing line of each of the individual series which enter the barometer is therefore varied as between times when the composite is favorable and times when the composite is unfavorable. This variation of basing line amounts to ten per cent, and is made in accordance with the two tendencies above described.

7. Since it is certain that the raw figures from which the composite is constructed contain an indefinite element of error, and since their treatment may introduce still further error, a neutral zone is in practice substituted for the established basing line. This zone extends one per cent on either side of the established basing line.

8. It was further determined that the greatest errors in correlation of the other charts (*i.e.* the Babson Chart, the Harvard Chart and the old Brookmire Chart) occurred because of abnormally large variations in some one or two included factors. This tendency to error, due to abnormal fluctuations, occurs because the further away from its normal or base any factor fluctuates the less importance is attached to the same amount of fluctuation. This tendency has been automatically eliminated by using the logarithms of the positive value of any position either above or below the established basing line of each of the individual series of this barometer.

9. The difficulty of distinguishing between a minor fluctuation and a major turn in the

forecasting factors is avoided by using a composite of individual factors whose time relationship to the item which we seek to forecast is such that it is not necessary to recognize the change in major direction either at the crest or at the trough of the movement. The significance of each factor does not change until it has crossed the established basing line.

10. The changes described in the immediately preceding paragraph permit us to eliminate minor fluctuations from the forecasting graph by constructing it to move upward or downward as much as the composite is above or below its basing line in any particular month. Thus a steady upward movement is shown so long as the composite remains on the favorable side of the basing line, and a steady downward movement so long as the composite remains on the unfavorable side. Each turn in the direction of the forecasting line indicates the crossing of the basing line by the forecasting composite; this means that every turn of the forecasting line is significant of an actual major fundamental change.

FACTORS USED IN THIS FUNDAMENTAL FORECASTING COMPOSITE

In this particular barometer there are four factors used in the construction of the funda-

mental forecasting composite. A large number of other factors which seem logically to have connection with the movements we are seeking to forecast were mathematically tested, but these are the four factors which, when mathematically tested, proved to have a close correlation with the changes in Bradstreet's index of commodity prices. These factors are:

1. *Physical Volume of Production in Primary Basic Industries.*—The people of any given country tend over a long period of years to establish a standard of living which becomes almost a habit, and when the physical volume of commodities moving into the domestic market is greater than necessary to maintain that standard of living, we should expect (other things being equal) that goods will accumulate in the warehouses and on the shelves of producers and distributors, and that this condition will bring about liquidation. This condition is measured by a composite of various measures of physical volume of activity in physical units, no monetary measures being involved.

The raw figures for this factor are those for pig iron production, steel ingot production, lumber cut, and cotton consumption, each figure of the series being for a calendar month. There are other industries, such as the motor industry, which are fully as important as the ones used, but which are purposely omitted, because, by

actual statistical tests, their figures are indexes or "thermometers" of current business rather than "barometers" forecasting coming movements. The same is true of figures covering railway transportation or shipping. It is the belief of the writer that it would be desirable to include the consumption of power units but, to date, the statistical problems of combining coal figures, oil figures and electrical power units into a composite have not been satisfactorily solved.

Before concluding this subject let us lay particular stress upon the standard of living, for it is not only one of the most fundamental things underlying business movements, but it is also one of the points most likely to be neglected in thinking about the subject. Impatient reformers are always expecting to change the habits of the human race in a few years. Advertising campaigns frequently do change the consuming habits of the people from one brand of commodity to another over a relatively small number of years. Each generation changes its economic habits and type of consumption from youth to middle age, and finally to old age. Indeed, in the optimism generated by a prolonged period of prosperity we sometimes almost unconsciously get to believe that the whole population has suddenly made a permanent change for the better in its living standards. Or, on the

other hand, we get so pessimistic in a long period of depression as to believe that living standards have permanently retrograded. But when we take into consideration millions or hundreds of millions of people, with age groups fairly constant, the habits do not change rapidly. The apparently sudden changes are merely a substitution of one thing for another, or are the pendulum swings which go first too high, and then too low, for the normal average, which changes slowly from year to year; and this normal remains one of the things upon which the business forecaster may rely throughout long periods.

2. *Ratio of Imports to Exports.*—If merchandise imports are exceptionally heavy relatively to merchandise exports this has the same effect as an exceptionally heavy volume of domestic goods coming to market. Conversely, if exports are heavy relatively to imports the effect is the same as that of a small volume of domestic commodities coming to market. This factor is tested by the ratio of import values to export values, a six months' sliding average being used to obviate meaningless monthly fluctuations. It will be noted that this measure is not expressed in monetary values, but it is a ratio for which monetary values are divided by monetary values, thus automatically removing the effect of inflation or deflation.

3. *Turnover of Bank Deposits.*—The people of any country would always be glad to live beyond their regular standard if they had the requisite purchasing power, and sometimes when such purchasing power is available they do live beyond their average standard for months or even years at a time. Conversely, it is always possible to fall below the regular standard, in case of necessity, without coming to the actual starvation point. And for months or even years at a time, when purchasing power is low, such a temporarily lowered standard of living does exist. The point then is to find a symptom of the time when purchasing power will permit or compel, as the case may be, a return to more normal conditions, and we seek a ratio which will measure the relationship between purchasing power in existence and that necessary to keep up the current standard of living whether it be above or below the average. To do this we turn to Professor Fisher's suggestion. It is impossible to measure in any consecutive and satisfactory way the speed at which actual cash is being circulated, but the turnover of bank deposits through a clearing house can be obtained every week, and it is evident that in a commercially organized country the greater factor in purchasing power is bank deposits rather than cash carried in the pockets of the population. Therefore, we measure this by the ratio between

the average clearings of clearing house banks and trust companies each week and the deposits of the same banks and trust companies. When that is higher than the average, after allowances for seasonal variation, existing purchasing power is being overworked and (other things being equal) a period of liquidation may be expected. Conversely, if it is lower than the average then savings are being accumulated from current incomes and a period of expanding prices first of stocks and then of commodities is in prospect.

The raw figures for this factor are taken from the statements of the New York Clearing House, the significant figure for each week being the quotient of the clearings divided by the average daily deposits of the same week. This figure is subject not only to a fairly regular seasonal variation but also to meaningless weekly variations. The figures are corrected for seasonal variation and the erratic weekly tendency obviated by the use of a three months' sliding average.

4. *Commercial Paper Rates.*—The deposits of any bank are not a rigid number of dollars, but can be increased or decreased as the bank expands or contracts its loans, since most of the deposits are only loans in another form. Therefore, in great constructive periods of activity the population of a country, by a steady increase

of credit accommodations, may continue to spend more than their current income for months and even for years at a time. There comes a time, however, when this increase reaches the limit and loans must be liquidated. The approach to that point is always heralded by a sharp rise in the rates for commercial loans; therefore, we measure its approach by the rate on commercial paper.

The raw figures for this factor are the rates on four to six months prime commercial paper in New York City. Its favorable or unfavorable significance is a matter not only of height but also of immediately preceding direction of movement. For illustration, 5 per cent has been the normal or average rate on such paper for as many years as its quotations can be traced with accuracy. Therefore we might arrive at a theoretical conclusion that a 5 per cent commercial paper rate invariably carries a neutral forecasting significance. Practical experience, however, shows that a 5 per cent rate reached by an upward movement from $4\frac{1}{2}$ per cent, or from any other rate lower than 5, is really of unfavorable significance, while a 5 per cent rate reached by a downward movement is really a favorable factor. Similarly a 6 per cent rate reached by a rising movement carries a greater unfavorable significance than 6 per cent reached by a falling movement, and the favorable sig-

nificance of a 4 per cent rate is greater or less according to whether that level has been reached by a falling or a rising movement. In order to make allowance for this condition the commercial paper rate factor in this barometer is made up as a series which in itself is an average of the coincident items of two series, one of which is the height of commercial paper rates dispersed from 5 per cent as a normal and the other the direction and extent of movement of that rate dispersed from 100 per cent as a normal. In each series the individual items for months are a sliding average based on the actual figures of three months. When the combined position for a single month is above normal the significance is unfavorable; when below, it is favorable.

WEIGHTING OF FACTORS

The matter of assigning weights to these factors for the construction of a composite opens up a whole field of technical discussion. It could not be covered in the space limits of this book and, if the space were taken, much of the discussion would be unintelligible to the general reader. Briefly, various weights suggested by reason have been subjected to statistical tests and the scale showing the best correlation with actual price movements has been adopted. That weighting is:

1. Physical volume of primary basic production, 1 weight.
2. Import-export ratio, 3 weights.
3. Turnover of bank deposits, 1 weight.
4. Commercial-paper rates, 2 weights.

Under certain conditions additional weight is assigned to the first and third factors for the following reasons:

1. When a downward movement of commodity prices has actually started it very seldom stops until the volume of domestic production has fallen below normal. Hence in such a situation an unfavorable (above normal) position of that factor is given triple weight.

2. When an upward movement of commodity prices has actually started, it very rarely stops until bank deposits have turned over at more than a normal rate for several months. Hence in such a situation a position of that factor below normal is given triple weight.

The composite resulting from this weighting is shown in Chart No. 9. With it is shown a graph of *Bradstreet's* Index of Commodity Prices in order to illustrate the correlation.

The arrows on the Barometer indicate the month of change from a favorable to an unfavorable position and vice versa.

The bases of the triangles on *Bradstreet's* Index of Commodity Prices include the fourth,

fifth and sixth months after the month of change in the Barometer.

CORRELATION WITH COMMODITY PRICES

When the composite of these factors crosses the neutral zone from a favorable to an unfavorable position the upward movement of commodity prices as shown by Bradstreet's Index will, on the average, reach its highest point five months later. The same lag prevails between a favorable crossing of the neutral zone and the bottom of a downward price movement. In actual practice the high or low point of prices occurs with a four or with a six months lag fully as frequently as with a five months lag. Therefore it is best to say that the turn of commodity prices will lag four to six months after the turn of the accumulated Forecasting Line.¹

The manufacturer or merchant has then at least four months warning during which he may increase or decrease inventory before the change in direction of the commodity price movement occurs. Usually he will have five months, and in some cases six months warning can be given. When the lag has been six months the damage to those who finished the operation in four months has rarely been large, and when the lag

¹ See explanation, Chart No. 9.

is only four months the damage to those who required six months for the operation has not been much larger.

CRITICISMS OF BAROMETER

The barometer just described is by no means a perfect one. On its very face it shows imperfections of past performance, and there is every reason to suppose that it will show imperfections in the future. As stated in previous chapters, the writer does not believe that the science of forecasting will ever produce a barometer not open to adverse criticism. However, that does not excuse avoidable errors. This barometer is an improvement of one published in a former edition of this book and there is every reason to believe that this one will be improved as the years pass. To a great extent that improvement will be guided by the basic principles set forth in Chapter IV, but it is well to present here certain outstanding criticisms of the present accomplishment as an indication of the direction likely to be followed in the next stages of the improvement.

These criticisms may well be divided into two groups:

1. Those which appear valid in the light of *a priori* reasoning but which have been shown to

be invalid when put to the test of correlation with actual history.

2. Those which appear valid from a theoretical standpoint but have not been put to a practical test. They have not been so tested either because of a complete lack of statistical data or because the data exist in a form which raises statistical problems that have not yet been solved. This is the group which points out the probable path for the next steps in forecasting progress.

Obviously neither of these groups can possibly include any except outstanding cases. Let us mention the following:—

1. The weight assigned to the import-export ratio seems, on first thought, an excessive one. This criticism might be answered by the blanket statement, made a little earlier, that the weights assigned are those shown by actual tests to be best. But if this weighting were entirely against reason, the writer would be doubtful of the accuracy of the tests. However, there are two very logical reasons for accepting this apparently excessive weighting.

A. The excess is more apparent than real, since, in case the import-export factor tends to cause a favorable turn in the composite and the physical volume factor is in disagreement with it, an equal weight is assigned to physical volume. Similarly, a position of the turnover

of bank deposits factor below normal would be given an equal weight with the import-export factor before allowing an unfavorable import-export ratio to dominate the entire composite in the registration of an unfavorable turn. In other words, the import-export ratio seems to have equal importance in checking a rise or a decline; a large inventory (measured by physical volume) seems to be most effective in postponing the beginning of a rise in commodity prices; and a large volume of available purchasing power (measured by the turnover of bank deposits) seems to be most effective in postponing the beginning of a decline in commodity prices.

B. In spite of this, it may seem to some that the relatively small amount of goods entering into our foreign trade should not be given so much consideration. The answer to that objection is that in most lines the goods which are either exported or imported are what economists call "marginal goods." Our whole barometer is, at bottom, a device for measuring the balance of supply and demand. Probably neither of these varies much more than fifteen or twenty per cent between prosperity and depression; hence the small marginal variations have a seemingly excessive weight in the final determination of prices.

2. A second apparent objection is that such

great industries as building and automotive manufacture, and such important indexes as railway traffic, are omitted. There is an obvious answer to this criticism in that many industries do not furnish figures in a usable form. The real root of the matter, however, is that these industries give a measure of current business rather than a barometer of coming changes. The purpose of constructing a barometric chart is not to show how high or how low business has gone, but to measure the balance of supply and demand. These industries furnish a supply of certain commodities for consumption or, as in the case of railway traffic, they show the movement of commodities to consuming points. But, on the other hand, they are also great consumers of basic raw materials. They change the form of inventories rather than add to the total, except in so far as the cost of the labor expended. It is doubtful whether they can ever be made to show forecasting significance. Certainly they have not yielded such results in tests already made.

3. The forecasting line itself shows a tendency, through a period of years, to slope upward. This gives some appearance of being overweighted with favorable factors, or, speaking more correctly from a statistical standpoint, of having the normal lines of the various factors placed too low. If the object were to con-

struct a balanced index of business conditions then this would be a valid criticism. Actually the construction of such an index is not under consideration in this case. The forecasting line is not an end in itself but a means to an end. That end or purpose is to determine each month whether actual conditions are such as to warrant the expectation of rising prices or the reverse. It happens that during the period covered by this chart commodity prices have risen during a great many more months than they have fallen. Consequently, the line, as it forecasts their rise by a rising movement of its own and their fall by a falling movement of its own, has risen many more months than it has fallen, and over the period has necessarily come to range at a higher level. In the future it must continue to have some such relationship to the secular trend of commodity prices.

Some of the criticisms which seem to be valid are:

1. There is no worthwhile correlation between the *rate* at which the forecasting line rises or falls and the *rate* of the following rise or fall in commodity prices. For example, the mathematics of the forecast simply say that a fall is coming and leave to judgment the question whether that fall will be a moderate decline like that of 1911 or a collapse like that of 1920. It is true that surrounding conditions permitted

some reasonable differences in the expectations at the close of 1910 and the close of 1919. Possibly this is one of the matters which can never be covered in a mathematical formula. The writer is fully convinced that many such will always exist, but, at least, this is one which merits further intensive study.

2. The factor of basic primary production is not based on as large a number of items as is theoretically desirable. This is a fault which economists cannot cure without the cooperation of business organizations. If more statistics are compiled, then more can be used. But, even with more statistics any great improvement along this line will be a matter of years, since a statistical series must be available for several periods of expansion and liquidation before its forecasting significance at various levels can be judged with reasonable accuracy. Therefore this improvement will require both cooperation and patience.

3. The single factor of the import-export ratio does not adequately represent the effect which foreign conditions have upon conditions in the United States. Variations in this ratio are in themselves the result of relative prosperity inside and outside of the United States, for merchandise tends to flow from relatively depressed markets into relatively buoyant markets just as surely as water tends to flow

from higher to lower levels. In a barometer presented in an earlier edition of this book the writer undertook to measure the foreign market conditions by the British money rates. Similarly he has experimented with the relative price levels in terms of gold of the United States and other countries. Other economists have tried exchange rates. However, the war and post-war movements of these statistical series have not yet yielded profitable results and this remains a problem to be solved by further study.

4. The barometer contains no direct measure of inventory accumulations or reductions. The whole composite represents an effort to measure the balance of supply and demand. As explained earlier in this chapter, when production is above normal it is an indication that it is probably outstripping consumption. A high ratio of imports to exports has the same general significance. A low turnover of bank deposits shows that consumers probably have enough purchasing power to consume more than is being produced. Thus we might repeat the reasons for the introduction of each factor into the composite. Each has a significant bearing upon the measurement of the country's aggregate inventory but, unfortunately, no really worthwhile statistics for its direct measurement can be found. It is true that many industries give figures of "stocks on hand" at various

points. These are good so far as they go. They are used in special bulletins of the Brookmire Service, which uses this composite, and by other Services, as well as in the calculations of private statisticians and business executives. But, at best, these reports of stocks on hand are patches of light in a great area of darkness, and the really dangerous excesses of supply do not always gather at the points of visibility. For example, the indirect measures used in this composite showed as early as October, 1919, that supply was exceeding demand at the current price level and that danger was ahead for the spring of 1920. Yet throughout the winter and early spring of 1920 practically every published figure of stocks on hand continued to indicate an exceptionally low inventory position. The break in the summer of 1920, however, brought to light huge stocks and proved that the broadly based indirect measures had gauged the situation much more accurately than the narrowly based direct measures.

Since 1920 it has frequently been said that individuals and corporations who stood in a position to profit by the false appearance of shortages, willfully manipulated figures to that end. It would be useless to deny that this accusation carries some truth, but it is a long way from reaching the root of the trouble. The true explanation was that excess stocks were scattered

through every step of the regular trade channels and were aggravated by other stocks in the hands of speculators who had no regular place in the trade at all. Makers of goods were usually as much and as sincerely amazed, when the truth became generally known, as were the final sellers or the consumers of those goods.

As a final comment on this criticism we might well say that there is little danger that indirect measurement will fail to detect such an over-expansion of supply, in comparison with demand, as occurred in 1906 or in 1919. However, the accuracy of gauging smaller maladjustments of these will be greatly increased when, and if, the figures of "stocks on hand" are ever broadened until they are of even such quality as present statistics of production in basic industries. This again is a matter in which professional economists alone are helpless. Any solution will require either the broadest cooperation from business executives or possibly even government action.

CONCLUSION

From the foregoing it will be seen that the writer does not regard any forecasting method as beyond adverse—and validly adverse—criticism. The most valid single ground for criticism of any economist, who attempts to fore-

cast, would be unwillingness to admit present limitations and to be on the alert for possible improvements. Present methods will probably appear crude and ineffective in comparison with methods which will be in use ten years or possibly even five years from now. In the meantime they represent a great advance over the ones in use a few years ago and give a still greater advantage over the mere dependence upon personal shrewdness to anticipate changes in business conditions.

CHAPTER VI

SECURITY BUYING AND THE ECONOMIC CYCLE

THE buyer of securities, who uses some method of forecasting the cycle changes in economic conditions as one of the bases for his purchases, needs to remember all the principles regarding the use of statistics which are named in Chapter II. Space will not be taken to cover all of that ground again, but we may begin our consideration of this problem by taking up in a more specific way some of the cautions necessary in such work.

In the first place, it should be noted that any forecast based upon general economic conditions will have four characteristics very worthy of note by the user who must buy some specific security or securities.

1. Such a forecast will indicate more accurately the tendency of the average of security prices than it will the tendency of any one specific security.

2. The trend of securities issued by large companies will be more accurately indicated than that of those issued by small companies; and

similarly the trend of securities issued by companies having a business widely distributed geographically will be more accurately indicated than that of securities from companies whose business has a relatively restricted geographic distribution.

3. Since the forecasts have to do not only with the conditions of the issuing companies, but also with the purchasing power of possible buyers, the securities of a company well known to a relatively large number of security buyers will follow the general changes of economic conditions more accurately than those of companies known to a relatively small number of buyers.

4. The minor waves within a cycle movement represent the give and take of speculation rather than the effect of fundamental conditions.

CLASSES OF SECURITIES

The phrase "average of security prices" is an indefinite one and must be closely defined before it is a useful idea in determining security prices. Generally speaking, the buyer of securities must divide them first into three great classes and average them separately if his averages are to have any practical meaning.

1. Those which are damaged by falling commodity prices and benefited by rising commodity prices to such an extent that this becomes at

all times one of the major factors in determining their trend.

2. Those which are benefited by falling commodity prices and damaged by rising commodity prices to such an extent that this becomes at times a very important factor in their price trends, but which more frequently move in response to other factors, with relatively little influence from the direction of the commodity price movement.

3. Those which are benefited by falling commodity prices and damaged by rising commodity prices to such an extent that this becomes at all times one of the major factors in determining their price trends.

This classification should not be taken to mean that direction of commodity price movement is the most important factor in the price trends of any group of securities, for, except possibly at rare intervals, it is not. The important point to be made is that most other factors which influence security prices tend to move the prices of all securities in the same direction, and therefore, in those rare cases in which one class of securities is in a major bull market while those of another class are in a major bear market, the explanation is to be found in the differing effects of commodity price movements on the different classes of securities.

In this classification of securities according to

the varying effects of commodity price trends upon the price trends of the securities in question, it should be kept clearly in mind that the factor under discussion is *commodity price trend or direction and rate of movement rather than the stabilization of commodity prices around any particular level*. While commodity prices are moving upward to unaccustomed levels, investors demand a relatively high rate of return on their capital, which we call a "high interest rate." With falling commodity prices this process is reversed. If commodity prices are fairly stable their height has little effect on either interest rates or security price changes. We might therefore make our same three classes under a different nomenclature:

1. Those securities which can meet the demand for a higher rate of return by increasing their dividends and can maintain that increase because rising commodity prices increase their gross earning power per unit as fast as or possibly even faster than, their costs.

2. Those securities which can meet some demand for a higher rate of return by increasing their dividend rates on account of the higher physical volumes which usually accompany rising prices, but which in a prolonged rise of commodity prices will ultimately lose this characteristic because rising costs will overtake their

relatively inflexible gross earning power per physical unit.

3. Those securities which can satisfy the demand for a higher return on capital only by a decline in their selling prices.

In the first group of securities we have those whose value is directly dependent upon the fluctuating profits of issuing corporations which can raise or lower their asking prices for goods or services at the free will of their managers. When commodity prices rise their profits are increased, or at the very least maintained, and in the meantime the replacement value of plants or other fixed assets owned also rises. This is the group of securities whose price changes are determined by causes most nearly approximating those which determine changes in commodity prices. The group includes not only the common stocks of all industrial corporations, but also any industrial bonds or preferred stocks whose equity is so small that dividends or interest payments may be threatened by the reductions in profits which accompany the low points of an economic cycle. Naturally, any one individual preferred stock or bond may move in or out of this class, but there always exists at any given time a group which really belongs in movement with the industrial common stocks.

In the second group we must place the stocks of public utility corporations, not only those

which are ordinarily called by this name, but also the stocks of the railroad companies. Actually the common stocks of these companies have fluctuating dividend rates, but the income from which these dividend rates must be taken is, in present day practice, rigidly limited by law, and the process of changing rates for service is so slow and cumbersome that, while in theory they might belong in the first group of securities, in actual practice their movements are at times decidedly different. The distinction between these securities and those in Group I did not exist prior to the establishment of various forms of government control over their rates and probably would not survive that control. Even now various power companies whose contracts with manufacturing companies are not so strictly controlled show a tendency to approximate the first group. This tendency is even more pronounced in the case of companies which sell hydro-electric power.

In the third group are those securities whose income and principal value are definitely fixed in monetary units. As this monetary unit increases in purchasing power, that is, as commodity prices fall, such securities—other things being equal—are benefited. Conversely, if those monetary units decrease in purchasing power, that is, if commodity prices are rising, such

securities will be harmed. Other things, of course, may overturn this tendency. But such securities sometimes break away from those in the other groups, particularly in periods of great swings of commodity prices. The difference in forecasting them is discussed later in this Chapter, but the point now is to establish in the mind of the reader the fact that the groups are distinct. This third group includes all bonds and preferred stocks whose equity is so strong that their interest or dividend is steadily paid through periods of depression as well as prosperity.

DIVERSIFICATION

Having noted the marked differences among the three great groups of stocks, and also some minor differences which occur within the groups themselves, we will find that in actual practice we must use not "an average of security prices" but such more specific terms as "average of industrial stock prices," "average of railroad stock prices," "average of railroad bond prices," etc. When we take this into consideration we may restate our first point regarding the relationship between economic forecasts and security price movements as follows: *A forecast based upon the general economic conditions which determine the price movements of a particular group*

of securities will approximate the movements of an average of the prices in this group more closely than those of any one particular security in it. In theory this would seem to make it necessary for the cycle follower to be a man of tremendous capital in order to get much benefit from forecasting the average movements, but, practically speaking, a group of ten widely distributed stocks will follow general conditions almost as accurately as any larger group, and even a single stock like U. S. Steel common will approximate the general movements. These points are illustrated in the following table, which, through the violent fluctuations of the war period and the post-war period to the end of 1924, compares the twenty industrial stock average used by the Brookmire Economic Service, the twenty-five stock average used by the New York *Times*, and a ten stock average made up of:

American Car and Foundry	General Electric
American Sugar	Studebaker
American Woolen	Texas Co.
Anaconda Copper	U. S. Rubber
Central Leather	U. S. Steel

In addition, the fluctuations of U. S. Steel common alone as an example of a widely distributed stock, and the fluctuations of Pan-American Petroleum as illustrating the rela-

tively erratic movements of a narrow specialty stock, are introduced.

	N. Y. Times Ave.	Brookmire Ave.	Selected 10 Stocks	U. S. Steel Common	Pan-Ameri- can Petro- leum Common
1916 Low	\$36.60 July	\$36.00 Apr.	\$91.96 Apr.	\$79.75 Mar.	\$46.00
1916 High	119.30 Nov.	110.15 Nov.	124.37 Nov.	129.75 Nov.	50.00
1917 Low	62.81 Dec.	65.95 Dec.	69.71 Dec.	79.50 Dec.	35.00 Dec.
1917 High	99.74 Jan.	99.18 Jan.	112.79 June	136.63 May	54.00 Aug.
1918 Low	71.31 Jan.	73.38 Jan.	78.14 Jan.	86.50 Mar.	40.00 Jan.
1918 High	91.55 Oct.	89.07 Oct.	101.95 Oct.	116.50 Aug.	72.25 Oct.
1919 Low	80.37 Feb.	79.15 Feb.	89.59 Feb.	88.25 Feb.	67.00 Jan.
1919 High	138.12 Nov.	119.48 Nov.	154.01 Oct.	115.50 July	140.25 Oct.
1920 Low	76.55 Dec.	65.03 Dec.	79.72 Dec.	76.25 Dec.	69.25 Dec.
1920 High	129.83 Apr.	109.61 Jan.	145.74 Jan.	109.00 Jan.	116.37 Apr.
1921 Low	66.24 Aug.	61.81 Aug.	75.05 Aug.	70.25 June	38.13 Aug.
1921 High	90.60 May	78.06 May	100.40 Apr.	86.50 May	79.37 Feb.
1922 Low	79.86 Jan.	75.51 Jan.	91.72 Jan.	82.00 Jan.	48.87 Jan.
1922 High	116.24 Oct.	99.16 Oct.	123.11 Oct.	111.50 Oct.	100.87 Dec.
1923 Low	99.05 Oct.	80.98 Oct.	87.92 Oct.	85.50 July	53.00 Sept.
1923 High	118.44 Mar.	101.00 Mar.	122.90 Feb.	109.63 Mar.	93.50 Feb.
1924 Low	103.26 Apr.	83.30 May	86.18 May	94.25 June	44.25 Feb.
1924 High	135.11 Dec.	111.43 Dec.	117.73 Dec.	121.00 Dec.	65.00 Dec.

One conclusion apparently justified from this table is that, while a large number of stocks may be desirable in an average for the sake of statistical accuracy, for practical purposes ten stocks of wide distribution will answer the investor's purpose. Another is, that the stock of a company having a wide distribution in the ownership of its stock and in the sale of its products, like United States Steel, follows the cycle accurately. Even in the case of a widely fluctuating specialty, like Pan-American Petroleum, a tremendous advantage would accrue to the follower of the cycle, though he used this stock alone.

The following practical points seem to be established:

1. The security buyer who is following major

price movements should seek, as far as possible, to distribute his purchases among various companies operating in different fields.

2. If, because of limited capital, it is necessary to buy relatively few securities, then he should select those of large companies, and particularly those of companies well known to a large buying public.

SECURITIES IN GROUP 1

Since securities in this group benefit not only from the conditions which usually accompany a rise in commodity prices, but also from the commodity price rise itself, it is inevitable that the composite of fundamental conditions correlated with their price changes should be very similar to the Commodity Price Barometer described in the preceding chapter. The outstanding differences seem to be:

1. The stock prices are affected by two factors which are part of the market itself:—

(a) The height of stock prices. The price of a stock is never so high that, under favorable conditions, it may not go higher. Short of zero, it is never so low that it may not be lower. On this account high prices do not necessarily mean the end of a bull market, nor do low prices necessarily mean the end of a bear market. However, we must admit that the average of

the prices of a large list of stocks through recent years expresses the composite judgment of security buyers through those years as to the real value of that group of stocks. Therefore, when the average of the prices of stocks in this group rises above the normal price in recent years, we should not buy them without asking for some outside reason to show us that they have in front of them a period of better than average earnings and dividends. Conversely, when they are selling below normal we must reason that they are selling at bargain prices, unless there are outside reasons to show that they face a period of abnormally low earnings and dividends. This factor is based upon the monthly average of prices of forty stocks (twenty rails and twenty industrials), compared with an average of the same stocks through the forty-eight immediately preceding months. In making each monthly average of prices, the rail group and the industrial group are first averaged separately. The respective weights of the groups are proportioned to the activity of all rails and of all other stocks on the New York Stock Exchange during the twelve months immediately preceding the month in question.

(b) Speculative activity. Great speculative activity usually indicates either heedless buying or forced selling. Like high stock prices it often appears a long time before the end of a

rising market. When it appears, however, we are justified in demanding very strong outside reasons for a continuation of a rise; and if it is still present in a declining market, we are justified in demanding very strong outside reasons for the end of a decline. When it is low there exists a presupposition that bargains are being offered to buyers.

2. The factors which influence both commodity prices and stock prices have different degrees of influence relatively to each other. To compensate for this, the weights assigned to the factors in the Stock Price Barometer are varied from those used in the Commodity Price Barometer.

3. Stock prices respond to fundamental changes much more quickly than do commodity prices. This correlation is so marked that many economists, including the writer, have used it in forecasting commodity prices but, as explained in an earlier chapter, it has been discarded in favor of more accurate approximations, because the time lag is too irregular.

Chart No. 10 shows the composite made¹ by including these two additional factors from the stock market itself. On the chart, is also found

¹ It should be noted that this composite shows in 1905 a brief downturn which is correlated with an equally brief downturn in stock prices. In the writer's opinion this constitutes a valid criticism similar to those noted on pages 111-113.

a graphic record of the Brookmire average of Industrial Stock Prices, with arrows marking the points indicated for purchases and sales according to the statistical movements of the composite.

The arrows indicate the months of change from a favorable to an unfavorable position or *vice versa*.

The ranges indicated by the arrows on the price average are the ranges of prices during the last fifteen days of the calendar month, indicated by the Barometer to be the month of high or low prices.

The correlation between the turns of the composite barometer and the prices of industrial stocks calls for:

1. The low point of industrial stock prices to occur during the month immediately following the upturn of the composite.

2. The high point of industrial stock prices to occur during the second month following the downturn of the composite, unless railroad stocks and public utility stocks have already been sold. (See later Barometer.) In this case the correlation calls for the high point of the industrial stock prices to occur in the month immediately following the downturn of the composite. The ranges shown by the arrows are the ranges of prices during the last fifteen days of

the calendar month indicated to be the month of high or low prices.

We may illustrate the use of this method by the buyer of common stocks and of other securities which get advantage from rising commodity prices, by following through the cycle which followed the panic of 1907. The preceding cycle, which included the 1907 panic, actually finished its decline about November 15, 1907, at which time the Brookmire average of industrial stocks reached a low of \$53. The changed condition was not recognizable from the fundamental conditions contained in the Industrial Stock Barometer until December 15th, at which time this same average of industrial stocks was selling for \$57.03 per share. A mechanical follower of the barometer would have made all his accumulations between that date and December 31st, the range of stocks during that time being from \$56.85 up to \$59.47. Actually, however, the full accumulation period lasted until the close of February, 1908. Stocks during this accumulation period got as high as \$65.84 on January 14th and closed the month of February at \$60.54. The security buyer should notice that during all of this time commodity prices were still declining, unemployment was increasing, and pessimism was the dominant factor in general financial sentiment. By the time this period closed the fol-

lower of the cycle should have accumulated as many stocks as his capital would justify him in carrying. They would have been sold to him at bargain prices by holders who found only discouragement in surface conditions.

The rapid and sustained rise of stock prices, which, coming after the period of accumulation, marks the beginning of a new cycle, began during the first week of March, 1908, at which time there was an easily recognizable change in general sentiment. Prices of stocks began to move forward although commodity prices, bank clearings and even the physical volume of production continued a downward movement. In this first period of the new cycle the follower of fundamental conditions would not be adding very much to his total holdings, for most of his purchases would have been made already. But insofar as he might come into possession of additional capital, or insofar as he might have failed to act in the last period of the preceding cycle, he would continue to expand his holdings. Until about June 1, 1908, when the industrial stock average reached \$74.38, signs of revival in business were not generally apparent.

From this point on, until the close of the rising period of the stock market cycle, we have rising commodity prices, increasing bank clearings, expanding physical volume of business, generally optimistic sentiment, and generally

speaking a further progressive rise of industrial stock prices. It is true that here and there individual companies, or even whole industries, fail to fulfill expectations; while, on the other hand, some companies and some whole industries show greater expansion than was expected. This causes irregularity, but the trend is upward. The cycle buyer of stocks will still continue to expand his holdings if further capital becomes available; but the most important characteristic of his action in this period is shifting from one stock, or one group of stocks, to another, as developments permit him to readjust his appraisal of conditions.

As the rising movement of stock prices progresses, it becomes of increasing importance to remember that one cannot rely upon any fundamental barometer to indicate the exact top of the movement. For that reason, it becomes increasingly dangerous to make further accumulation of stocks. Nearly every great bull market in securities has a distribution period ranging from two or three months up to as much as a year. Sometimes this period of distribution occurs before the Stock Barometer indicates the top of the movement, as for example, in 1912, 1916, 1919 and 1923. Sometimes it occurs partly before and partly after the turn of the Barometer, as in 1909. At still other times it occurs after the turn of the Barometer, as in

1906 and 1925. Since present methods of forecasting do not enable us to distinguish clearly between hesitation in the rising period and the beginning of distribution—in those cases in which distribution comes before the turn of the barometer—the only real safeguard is to stop the accumulation of stocks in advance of the unfavorable turn of the barometer. This will result in the failure to obtain all possible profits in the bull market, but it will even more frequently prevent getting into a situation where the taking of actual losses will be necessary.

The beginning of the third or liquidation period of the cycle is usually heralded by sharp rises in money rates and by an increase in the velocity of turnover of bank deposits, which may be caused either by an increase in clearings greater than the increase in deposits, or by stationary clearings with a decrease in deposits. Usually the deposits become stationary while the clearings continue to increase. Similarly, there will be in most cycles a great increase in the physical volume of production and an increase in the ratio of imports to exports. These are among the factors which enter the Industrial Stock Barometer. In the cycle under discussion the beginning of the liquidation period was indicated by the barometer on September 15, 1909. A person following the indications of the Barometer would have sold stocks

between October 15th and October 31st with prices ranging from \$95.70 to \$99.07. In this particular cycle the distribution had, as noted in the preceding paragraph, been in progress before the turn of the barometer. It continued after the turn of the barometer until the early days of January, 1910, with stocks ranging from \$95.89 up to \$100.53 during the months of November and December, 1909.

Then followed a liquidation period which lasted until July, 1910, when the average of industrial stocks reached an extreme low of \$73.62. Prior to this period of liquidation the cycle follower would have taken practically all of his money out of stocks and, as will be noted, would not have begun accumulating them again for a period of ten months.

Theoretically the proper action for him would be to sell stocks short, when he liquidates his holdings, and to repurchase these stocks at the beginning of the next accumulation period. Practically speaking, many speculators do not wish to sell short at any time, and most of the investors who are actively engaged in some other business should not sell short because of the amount of time and knowledge of technical operations essential for success in this field. He is confronted then with the necessity for putting his money to work. Even if one should simply let his money lie idle for these ten

months it would be a profitable operation, for the twenty-five point decline in stocks would much more than wipe out any dividend income; but there is no reason why money should not either be kept on thirty day time deposits or else employed in the purchase of very high grade short term notes. It will not be possible to have these notes mature at just the time the money is wanted for the next accumulation, but, if they are of very short maturity and the highest grade, they can either be sold at a price which will subtract only a little from the income yield, or else can be used as a margin in the making of purchases when the accumulation period arrives.

The change from this liquidation period was not indicated by the barometer until the 15th of September, 1910, when the average price of industrials was \$78.38. During the next fifteen days the range was from \$78.37 up to \$79.72. Actually the accumulation period of the cycle had begun during the latter part of July, and this accumulation period lasted until the end of September, by which time stocks were selling at \$79.72. From that period began the rising period of the next cycle movement.

This forecasting method is designed primarily for those who are interested in building estates rather than for those who are seeking quick speculative profits. People always hesitate,

however, to liquidate security holdings in a market which is still rising. As noted earlier, short selling does not and should not form a part of the activities of most security buyers, but there is no logical escape from the conclusion that the time to liquidate holdings is also the profitable time to make short sales if they are to be made at all. Because of these two reasons it is well to note what seem to be two well-established characteristics of the correlation between a downturn in the forecasting composite and the correlated decline in security prices. These are:

1. If a downturn of the Industrial Stock Barometer is coincident with or subsequent to a downturn of the Commodity Price Barometer, a rapid downturn in industrial stock prices, with little tendency toward sustained rallies, may be expected. This characteristic was exhibited in 1909, 1912, 1919, 1923 and 1924.

2. If a downturn in the Barometer of Industrial Stock Prices precedes a downturn in the Barometer of Commodity Prices we may expect an early and sharp downward movement of industrial stock prices. But, if the Barometer of Commodity Prices continues its rise during the early stock price decline, then we may expect a recovery in industrial stock prices. This recovery may or may not carry the stock price average to new high points, but it has in

every case carried individual stocks to new high points. This characteristic was demonstrated in 1906, 1916 and 1925. In 1906 the average of industrials failed to regain the previous top, the highest point of the recovery falling more than five points short of it. However, individual stocks went much above their previous tops and continued to do so until about February 5, 1907. In 1916-17, the recovery was more than ten points short of the previous high, but at least twenty industrial stocks rose to higher prices in June, 1917, than these individual stocks had reached at any time in 1916. In 1925 the average of industrial stocks reached a new high level and nearly half of the stocks in this group attained new individual high prices.

It should be noted that this second characteristic does not necessarily mean that the recovery of industrial stocks from their initial decline will last until the Barometer of Commodity Prices has turned bearish. It did last till that barometer turned bearish in 1906, but in 1917 the recovery in industrial stocks ended with an additional decline of over thirty points, although the Barometer of Commodity Prices remained favorable throughout the entire bear market. The 1925 movement has not finished as this is being written. The point which seems reasonably established is that such a recovery

will come. The balance of probability is that it will end by the time the Commodity Price Barometer turns downward or, in other words, at least four months before the decline in commodity prices begins. There seems, however, no reasonable certainty that it will not end sooner than that.

Also, in each of these recoveries, large numbers of stocks fail to return to the high point directly correlated with the Barometer of Industrial Stock prices. At the time of going to press in 1925, this is still true, although the average in July has been slightly higher than the peak reached earlier in the year. This characteristic common to all three cycles where the recovery in price occurred, indicates that when the industrial stock price and the commodity price barometers turn downward at widely different times, there is much less tendency for all types of industrial stocks to center their high points around the same month, and that instead there is a tendency for the various groups of industrial stocks to scatter their high points over a period of six months or more. However, there was no similarity in the order in which the various groups finished their movement in the two cases for which the completed record is available. Therefore the investor who prefers safety to excitement would do best by selling at the point indicated by the Industrial

Stock Barometer, while the speculator who prefers to take chances on holding longer should realize that he is in a zone of constant danger and govern his actions accordingly.

STOCKS IN GROUP 2

Since, with the exception of commodity price changes, all measurable factors which influence security price changes tend to influence all security prices in the same direction, the composite which forecasts stock prices of Group 1, requires very little change when applied to Group 2. Indeed the difference of effect is so slight that it has not been found practically helpful to introduce the direction of movement of commodity prices as a separate statistical factor. The variation in the two forecasting lines has been accomplished by reducing the weight given to low volume of production as a favorable factor. It will be recalled¹ that the forecasting significance which rightly attaches to high or low volume of production does not do so because of its immediate effect but because of its effect upon the future. It almost goes without saying that high physical volumes of production are favorable and low volumes unfavorable in their immediate effect on either railroad, public utility or industrial earnings.

¹ Chapter V.

The reason they have the opposite significance as *forecasting* or *barometric* factors is that they are warnings of a coming change in the opposite direction for both physical volumes of business and for commodity prices. For industrial stocks a coming decline in either of these two is unfavorable and a rise favorable, but for rails and public utilities a drop in physical volumes will be partially offset by the drop in costs which comes with falling commodity prices, and usually without any decline in the rate of charge per physical unit of service, while a rise in physical volumes will be partially (sometimes wholly) offset by the rise in costs, usually without any compensating rise in the rates for physical units of service sold.

The composite ¹ resulting from this changed weighting is shown in Chart No. 11. The correlation between the turns of the composite barometer and the prices of railroad stocks and of public utility stocks calls for the high or low point of stock prices to occur during the month immediately following the change in the composite. The ranges shown by the arrows are the ranges of prices during the last fifteen days of the calendar month indicated to be the month of high or low prices.

¹It should be noted that this composite shows in 1905 a brief downturn which is correlated to an equally brief downturn in stock prices. In the writer's opinion this constitutes a valid criticism similar to those noted on pages 111-113.

In the same cycle discussed in detail for Group 1 this new line indicates the beginning of the movement at exactly the same time as the beginning of the movement for industrial stocks, but the top of the movement is placed in September of 1909 rather than in October as in the other case.

The policies to be followed through this cycle are so nearly identical for the two groups of stocks that it would be superfluous to cover all of the ground again. Instead, let us turn to 1919, where the movements were radically different. The purchasing point for Group 2 was indicated in the same month as for Group 1, that is, in December, 1917. At that time railroad and public utility companies were almost crushed under rising costs without any compensating rise in rates. In other words, we could scarcely find a time when on the surface conditions appeared more unfavorable for either rails or public utilities.

Those who bought rails in 1917 had little need of the patience which is so frequently required of the cycle follower. The quick rise in those stock prices is, however, a better illustration of the effect of factors not measured by a statistical barometer than of the force of those factors which are measured by such a barometer. Before the close of the buying month (December, 1917) President Wilson announced that the

United States government would take over the railroads and would guarantee to their owners a standard return based upon the three preceding years. For the time being this undoubtedly submerged all other considerations in the minds of holders or possible purchasers of railway securities. The resultant price movement was in the direction already forecast by fundamental conditions. Therefore those who have confidence in such indications may believe that the prices would have risen without such interference, and no one can ever prove the contrary. However, they are equally barred from using the movement as a proof of the accuracy of the forecast, and must in all reason admit that the rise was at least both accelerated and increased by the force outside the field of statistical measurements.

It is then to public utilities that we must turn for demonstration of the true action of stocks in this second group. Late in December, 1917, when the buying indication was registered, these stocks reached an average of 78. In January, 1918, they reached an average of 84. For a year and a half afterward they were strong, reaching their highest point in November, 1918, when many believed that the Armistice would bring an immediate restoration of pre-war conditions. From that point on through the great bull market of 1919 these

stocks held near their top, helped on the one side by increasing volumes of business, but hurt, on the other hand, by rising costs. Finally, however, in July of 1919 the follower of fundamentals would have sold them at an average price of 82. By the time the industrials reached their selling point in October the public utility average had declined to 75, or three points lower than the extreme low of 1917. From a comparison of these two charts we may safely draw three practical conclusions regarding the distinctions between stocks in Groups 1 and 2.

(1) When business prosperity is attended by an ordinary balance between business volumes and price movements no practical distinction of policy is necessary in the handling of these two groups, except that it is usually safer to hold stocks in Group 1 about one month longer than those in Group 2.

(2) In a period of prosperity attended by sharp commodity price rises the culmination of the rise in stock prices is likely to be seen much earlier in Group 2 than in Group 1.

(3) If the outstanding feature of a period of business prosperity is rapidly rising commodity prices with relatively small increases in physical volumes, then much greater profits can be gained by buying stocks in Group 1 than by buying those in Group 2. If, however, we

should come into some period of great physical volumes with relatively small price rises, then those in Group 2 will probably make the better showing.

SECURITIES IN GROUP 3

The conditions which produce rises or declines in the securities of Groups 1 and 2 have lent themselves readily to graphic presentation and have been so complex that they could not readily be grasped as a unit until thrown into a graphic composite. Those correlated with the price changes of bonds and other securities in Group 3 are at once simpler, and at the same time more difficult to present graphically. We shall therefore present them without a graphic composite.

In order to check a decline in the bond market and to bring about a rising movement in bond prices, two conditions must be present.

1. The release of large sums of capital which have been employed in speculation or in general business.

2. A downward trend of commodity prices continuing for a period long enough to make the fixed rates of bonds and high-grade preferred stocks seem attractive.

It is not necessary to measure all the causes which may be behind these two developments.

Practical tests say they are present when we find a coincidence of:

1. A sufficiently long and steady decline of stock prices so that a six months' sliding average of their direction of movement will remain on a flat or decline for three consecutive months.

2. A sufficiently long and steady decline of commodity prices so that a six months' sliding average of their direction of movement will accumulate a loss of one per cent.

Many will be surprised to note that these indications of a coming rise in the bond market do not include money rates. It is a fact, however, that the two greatest bond price rises of the present century (1907-08 and 1920-22) have started while money rates were not only high but still rising, so that one who waits for this additional factor will wait too long.

The end of a rise and the beginning of a decline in bond prices is not so easily forecast. A reversal of the conditions which would indicate a rise in bond prices has frequently been seen many months before the end of that rise. The factors which have occurred, either in sequence or in coincidence, before a decline in bond prices are:

1. An increase for at least three consecutive months in the six months' sliding average of stock prices.

2. At least a $1\frac{1}{2}$ per cent accumulated rise

in the six months' sliding average of commodity prices.

3. At least a 1 per cent rise in commodity prices during a single month after the continued rise mentioned in No. 2 immediately preceding.

4. An unfavorable (upward) change in the commercial paper rate.

The dates of buying and selling by one who followed these tests are shown in Chart No. 12.

Let us illustrate the policy of one following these tests through the cycle beginning after the panic of 1907, by using a composite of twenty high-grade railroad bonds to represent the bond market.

The accumulation period, which marked the close of the previous cycle, began with the composite of twenty railroad bonds yielding 4.46 per cent in November, 1907, and it is assumed that the follower of this policy had his funds in liquid form, as will be indicated in describing later periods of the cycle. The opportunity to buy at low levels lasted through March, 1908, which is one month longer than it lasted in the industrial stock market. During this entire period the policy of the bond buyer would have been to accumulate long-term issues, that is, issues having ten years or more to maturity, because when the general interest level is falling, or, in other words, the general level of bond prices rising, it is long-term maturities which

respond most readily. If he had followed the indications of the previously described factors in a purely mechanical way, practically all of these long-term bonds would have been bought during the month of November, although any additional funds which might have become available during the accumulation period would have been used in the purchase of the same class of securities.

The rising period of the bond cycle extended from April, 1908, to the end of the year, during all of which time the bond demand exceeded the supply of new issues and the prices on old issues moved steadily upward.

The high prices of bonds in this cycle lasted to the end of June, 1909, although little price increase was seen after January 1st. During the time between these dates, the supply of new bonds was beginning to equal the demand, and on account of the great rise which had occurred in commodity prices the demand for long-term issues was gradually decreasing. When the combination of factors previously described had become definitely unfavorable in April the yield on the twenty bonds was 4.02 per cent. The policy of the investor through this period of high bond prices should be practically the same as during the period of rising prices. As a practical matter a change from the rising to the high period of the bond cycle makes little difference,

the important point being the recognition of the change from the period of high prices to the period of falling prices, and again from the period of falling prices to the accumulation period.

At the beginning of the period of falling bond prices the bond investor should sharply reverse his policy regarding long-term and short-term issues. The swings of bond prices in most cycles are hardly large enough to warrant selling out bonds at the close of the period of high prices if the money must be kept as a bank deposit. But short-term issues, as noted earlier in the chapter, will give almost as good a yield on money as long-term issues, and will depreciate very little in price during the liquidation period. Therefore, with the beginning of the liquidation period the bond investor should sell his long-term issues as rapidly as possible and place his money in approximately a liquid form by the purchase of high grade short-term notes or bonds, originally long-term but now about to mature. The matter of "high grade" should be emphasized as much as that of short-term maturity, for the holder will either want these notes paid or want to use them as collateral at a time when business and financial conditions are badly strained at the close of the liquidation period, so that safety is more important than high yield at this stage of the cycle.

The policy outlined in the preceding paragraph is the theoretical ideal for any individual or institutional holder of bonds. It is realized that very few institutions could follow it completely, and that many large individual investors would find it very difficult to shift all their long-term holdings into short maturities. It would be foolish to attempt here a description of the various gradations by which it might be approximated. It will therefore be left as a theoretical standard to be approached as closely as practical conditions will permit.

The liquidation period of the cycle under discussion continued into July, 1910, by which time the average yield on the composite of twenty bonds had increased to 4.20 per cent. By August 1st the combination of fundamental factors indicated the beginning of the accumulation period, and the investor, guided by these factors, would have sold short-term issues and purchased long-term bonds during the month of August.

This accumulation period had begun during July, and the improvement period of the following cycle began almost immediately. This difference in length of the accumulation periods is easily apparent to one looking backward, but its recognition at the time would have been much more difficult. The reason for this difference in the length of the accumulation period of

this new cycle and that of the preceding cycle is more closely connected with the total rise in bond prices than with the action of those prices in the first few months following the change from falling to rising prices. In the one case the investor who did not act promptly had additional opportunities to purchase before most of the rise in bond prices was past; in the other case he did not. This emphasizes the fact that although the accumulation period may be as long as it was after the 1907 panic, no reliance can be placed on this tendency, and the movements of the investor should be as rapid as possible without making great sacrifices through friction of the market.

In addition to the varying policies shown during the different periods of the cycle it is worthy of note that shifting from issue to issue must always be a large factor in the policy of any bond investor who is more successful than the average. Bonds do not have as ready a market with speculators as industrial stocks do. Therefore, when the holder of a large block of any good issue tries to liquidate he frequently sells at a considerable sacrifice. Conversely, the buyer who insists on having some particular issue frequently pays much above its true market value at a given time. Manifestly this shifting operation goes on at all points in the cycle and no assistance is gotten in it by following

the major up and down swings, but a part of every investor's equipment should be contact with some good authority which will keep him advised of opportunities to sell bonds, which are selling up to or above their justified price in any given market, and to shift the money into bonds which are being offered at bargains.

RELATION OF MINOR FLUCTUATIONS TO CYCLE MOVEMENTS

In examining the charts presented in this chapter it will be noticed that during the course of the cycle movement there have been many minor fluctuations in opposite directions. These fluctuations, as noted in an earlier paragraph, are the result of give and take operations between men who make it a business to buy and sell securities, and also between these same professional operators and the public. These movements are not correlated with the fundamental conditions expressed in the barometers. Therefore, anyone who wishes to enter the market for only a few weeks at a time will have no assurance that his venture will be profitable just because he enters on the side of the market indicated by the general cycle movement. There are apparently only two advantages which the short swing speculator or trader can get from a knowledge of the direction in which

the cycle of security prices is moving. These are:

1. In a rising major market the sum of the minor rises must inevitably be very considerably greater than the sum of the minor declines, while conversely, in a falling major market the sum of the minor declines must necessarily be very considerably greater than the sum of the minor rises. Therefore, although a knowledge of the trend of the major direction does not warrant us in saying that the next minor movement will be in the same direction, still the short swing speculator who persistently takes the long side of the market in a rising movement will find his profits very much outbalancing his losses. Similarly, if he enters the market over and over again on the short side during a falling market his profits will again outbalance his losses.

2. So long as the major cycle is rising the top of each minor swing is likely to be higher than the top of the previous swing, while in a falling cycle movement the bottom of each minor decline is likely to be lower than the bottom of the previous minor decline. Therefore, one who enters the buying side of the market for a short time during the rising periods of the cycle and finds himself wrong on that minor turn has only to wait for the next wave, when he will be able

to sell at a profit, and the converse proposition can be utilized in a falling market.

So far as these two points are concerned, the speculator can use fundamental forecasting to aid his operations. There are some statisticians who believe they can correlate all minor swings to certain statistical factors, but the writer is still inclined to doubt all claims that have been made in this respect.

WHAT IS THE MOST PROFITABLE METHOD OF OPERATING IN SECURITIES?

The answer to this question must of necessity be a matter of personal opinion. The policies outlined in this chapter have been placed here not as the only way to operate in the security market, but for the assistance of those who have already decided that they wish to adopt this relatively conservative method of operation. It is undoubtedly possible for one who gives all of his time to security speculation and who intelligently follows the general upward and downward movements of the market so that he takes his chances with a maximum possibility of profit and a minimum possibility of loss, to make more money by speculative operations than could be made with the use of the same amount of capital in investment, or in that type of speculation which simply tries to buy at

approximately the low point of a cycle movement and to sell at approximately the high point. In spite of this possibility, however, it is doubtful if the same amount of time, effort and mental ability applied to general business would not yield greater results.

Certainly for the average man who is engaged in some occupation other than security speculation, it seems that the best results will be gained by following those general policies described in this chapter, rather than by active trading. More certainly still, such a policy will yield results far better than those of the man who simply buys at any time that capital chances to be available.

CHAPTER VII

MANUFACTURING AND MERCANTILE POLICIES THROUGH A BUSINESS CYCLE

THE problem of the manufacturer or the merchant who seeks to follow the cycle movement in the management of his business is much less simple than that of the investor in securities. The investor can, if he desires, shift quickly from the securities of one company to those of its competitor, or even into an entirely new industry. Similarly, he can change from long term to short term securities between periods of the cycle, as has been shown, and can always keep his money profitably at work without loss of principal even in the most extreme periods of liquidation. The manufacturer or merchant, on the other hand, must continue in business whether business is good or bad, for even if he completely closes down a plant the overhead charges in the form of loss of interest on the investment, depreciation, taxes and insurance must be met. In describing the policy of the investor we have sought to outline a policy in which the investor would discontinue the owner-

ship of securities whose price is being depreciated. Of course we realize that that is not always possible in practice, but it is the theoretical goal to which the investor strives.

The manufacturer or merchant, on the other hand, since he must retain the ownership of his business through bad times as well as through good times, turns his attention rather to plans for expansion and contraction. By this we mean that, when fundamental conditions are favorable for the making of profits he will expand his inventories and expand the amount of labor which is working for him. In doing this he will borrow working capital and will take profits on a larger volume of business and a larger inventory than he would if he simply allowed his organization to run along in a routine way. Conversely, when fundamental conditions indicate the coming of unfavorable business developments, he will dispose of his inventories, decrease his labor force, and pay back his borrowed money, so that the inevitable period of lean profits and possibly unavoidable losses will find him responsible for a business relatively smaller than he would have if he simply conducted it in a routine way.

It is sometimes said that sentiment of the public regarding business conditions is generally wrong. This is not an accurate statement, for there are long periods of rising activity during

which sentiment of the average business man is optimistic, and there are long periods of declining business when the average business man is pessimistic. But just at the turn from prosperity into depression, or the reverse, sentiment in general is usually taking the wrong view of the situation. This is due to the fact that surface conditions are best or worst just before the reverse movement begins. The business economist, therefore, seeks to bring to the attention of the manufacturer or the merchant those conditions which are not apparent on the surface, but which move far enough in advance of surface conditions so that he may be warned at a date earlier than general business sentiment changes.

The barometer upon which the writer would base the forecasting of business conditions has already been explained in Chapter V and its description need not be repeated here. It is true that it is designed primarily to indicate coming changes in commodity prices, but it is also true that rises or declines of business prosperity do not occur without average commodity price changes in the same direction. Men all the way from soap-box orators to bank presidents have urged the *ideal* of giving great volumes without increasing costs, and individual plants, or even whole industries, have learned to make the units

of their product more cheaply, to sell more at lower prices and still to gain profits for themselves. However, the writer has been able to find no case in economic history where a general increase in physical volume of production has not been closely connected with a rise in commodity prices.

Three principles regarding the relationship between commodity price movements and general prosperity seem fairly well established.

(1) An individual plant or industry may, by decreased costs and decreased selling price, so increase the demand for its product as to reap greater profits.

(2) If decreased costs are achieved at the expense of a lowering of general commodity prices or of general wage rates, then buying power falls as fast or even faster than selling prices and we have depression instead of prosperity. Similarly, so far as manufacturing and mercantile firms are concerned, rising costs due to generally rising commodity prices or generally rising wage rates are more than counterbalanced by rising sales, at rising prices, so that for the time at least, we have prosperity.

(3) Because of the relationship mentioned in No. 2 a barometer of average commodity prices may well be used as a barometer of general business.

MANUFACTURING POLICY

The conditions which characterize the close of a manufacturing cycle are usually that factories are shut down, a large percentage of labor is unemployed, stocks of raw materials are low in the hands of either producers or users, and factory equipment has not been expanded since the close of the prosperity period. As a result of this combination of circumstances money rates are relatively low and credit relatively easy.

Those manufacturers who start into the first or improvement period of a new cycle from such conditions as these will suddenly find that the demand for their product is much greater than they had anticipated, and find it necessary to do a considerable amount of preliminary work before they can actually begin meeting the demand. Therefore, generally speaking, those manufacturers who do not anticipate cycle movements are engaged in preparing their factories at the time when they should be accumulating raw material and beginning the actual expansion of production. For this reason we can hardly give a description of the policy of the manufacturer in the first period of the cycle without noting that a real cycle follower was spending the last few months of the previous readjustment period in actually increasing his

equipment, so that his attention during the first period of the cycle could be concentrated upon production rather than upon the preparation of instruments of production. The warning to get ready will have come to him four to six months in advance, through the change of the Forecasting Composite for commodity prices. (See Chart 9.)

During the first period of the cycle general demand for the manufacturer's product, although rising, is likely to be considerably below normal, and the most immediate problem is not so much that of expanding production, as that of accumulating raw materials against the expansion which is to come as the movement proceeds. Raw materials are at this time of the cycle very close to their bottom. It is still a "buyer's market." Sellers are anxious to take orders which will later permit them to be more independent in the fixing of their prices. At the same time bankers are in a position to extend credit on favorable terms to the man who wishes to buy. This first period of the cycle is also the time when railroads have abnormally easy shipping facilities, and when steamship companies are seeking use for their cargo space.

The first step then, for the manufacturer, is to purchase and have physically delivered to his plant an inventory of raw material disproportionately large in relation not only to the actual

operations at the time but also to the actual orders which he has on hand. In addition to this actual physical delivery of raw material inventory, it is important to place forward contracts at the low prices prevailing, which will later give an advantage to the foresighted man when competitors are rushing into the market to buy.

As we proceed upward in the improvement period, we come to the point where increase of output becomes important. For many lines of business where special goods are made up on order this increase of output must necessarily be an automatic thing, determined by the receipt of orders and specifications for shipments. But there are many manufacturing businesses in which the standardization of product will permit the making of goods for stock. Such concerns are justified at this point of the cycle in taking advantage of easy credit conditions, low labor costs, and low raw material costs, to manufacture goods somewhat in excess of their actual delivery requirements, feeling confident that they will be able to sell these goods later in a consistently strengthening market.

The most conspicuous difference between the first, or improvement period, and the second or "prosperity" period of a manufacturing cycle is found in the volume of business moving. It is not very important for the manufacturer to

recognize when this change occurs, for his policy of increasing his output should be continued until the end of the second period is in sight. The only minor change to be noted as we enter the second period is that, as progress in the expansion of business is made the cost of money may increase, and the cost of production due to rising wages and rising costs for any additional raw materials which must be bought is certainly rising. Therefore, when it becomes fully apparent that business activity has risen into the "prosperity" period of the cycle, the practice of making extra goods for addition to inventories should be discontinued.

One of the most important accomplishments for the manufacturer who is following the cycle policy, is to recognize clearly in advance when the end of the "prosperity" period is approaching. Statistically speaking the characteristics of the closing months of any "prosperity" period are: high commodity prices, rising money rates, continued expansion in bank clearings without a counterbalancing increase in bank deposits, rapid increase of merchandise imports which frequently are not balanced by corresponding exports, and a physical volume of production larger than is necessary to maintain the ordinary standards of living. These movements cause the forecasting line of the barometer described in Chapter V (pages 93-107) to turn downward some

four or six months before the end of the business prosperity is likely to arrive. When this is seen the manufacturer should begin gradually to curtail his supplies of raw material, centering his efforts upon making up the supplies already on hand and selling the finished products either for cash payments or to buyers of good credit. In the vast majority of cases the manufacturer should have his inventories at a minimum not later than the sixth month after the downturn in the forecasting line of the Commodity Price Barometer.

At this point comes a practical application of the difference between the problem of an investor and that of a manufacturer. The manufacturer can not be contented with the negative preparations for a coming decline. He can not cease to be responsible for his business, and something of a positive nature must be added. One should not make the mistake of assuming that the positive steps can so thoroughly avoid the effects of a general depression as to obviate the necessity of using negative safeguards, but they are equally important. The positive steps are discussed later in this chapter, under a discussion of advertising and selling through a cycle.

The manufacturer who has followed these policies through the second period of the cycle, will enter the third or liquidation period with

his inventories of raw materials at a minimum, although at the very beginning of the third period, business activity, though declining, will still be running somewhat above the average or normal condition. During the early part of this third period he will curtail the output of finished product, and will seek very early in the decline to bring his inventories of the finished product down to the hand-to-mouth basis, that is, simply getting out enough goods to meet immediate orders, realizing that some of the orders on his books which have been placed at the higher prices and in the over-confidence of the end of the prosperity period either will be cancelled or else it will be unwise to deliver them to customers whose credit has become impaired.

As the liquidation period proceeds the manufacturer who has his plant partly shut down will use this opportunity to bring about an increase in its efficiency. It is scarcely necessary to elaborate on the meaning of the phrase "Increase efficiency." During the period of prosperity, the physical equipment of a plant is almost inevitably run for too long a time without overhauling and repairs. The personnel gets a careless attitude during the period when wages are high and change of employment easy, and the organization gets less efficient in all matters except the rushing of the volume of production. In addition to these things which

affect an organization, whether it has grown or not, it is usually true that every business organization during the period of prosperity undergoes a rapid and relatively poorly planned expansion. This is true both in the way of physical units of equipment and in the way of additional personnel. The slack period following the first sharp drop in the liquidation period, is one in which readjustment of physical equipment and reorganization of human elements in a business can be carried out without any large immediate expenditures of money. Similarly, it is a time when, with a small necessity for production, the inefficient machine and the inefficient worker can be eliminated without the necessity for immediate replacement.

The change from the third period to the fourth or readjustment period of the cycle is a transition where recognition of the time element is highly important. Statistically speaking, the usual characteristics of a business situation at the time of this change are: low volumes of production throughout the business world in general, falling money rates, declining bank clearings without a corresponding decline in total bank deposits, and often an increase in exports without a counterbalancing increase of merchandise imports. The changes in these factors cause the barometer described in Chapter V (pages 93-107) to turn upward some four to

months before the improvement period in a new cycle is to start. This favorable turn of the barometer is a signal to the manufacturer that the fourth or readjustment period of the cycle has begun.

The time has now arrived when equipment should be increased. This increase of equipment will be facilitated by the ease of credit conditions, the low costs of labor and material, and by the fact that transportation will be easy to secure. Its object is to prepare for the improvement period of the next cycle, and to be ready to begin again the movement through the four periods of a new cycle, similar to that which has been described.

MERCANTILE POLICY

The merchant's policy throughout the economic cycle is closely related to that of the manufacturer as described in earlier paragraphs. At the close of the old business cycle he has his plans for expansion already made. The conditions in which he finds himself at the beginning of the cycle are the same as those of the manufacturer. His first movement is to take advantage of the "buyer's market" to increase the stock of goods carried, so that he not only gets the advantage of the low prices still in effect

but is able to offer the early buyer in the market the best possible selection of goods and the best service in the way of immediate deliveries. This policy is continued throughout the entire period of improvement and into the early months of the second or prosperity period. A change of policy should be made during this second period because stocks are then so fully assorted and in such large quantities as to make it unnecessary to expand them any more. Hence the policy should be to maintain stock rather than to increase stock.

This heavily stocked condition should be maintained until the warning of a coming decline in commodity prices is given. This will occur at a time when general sentiment throughout the country is optimistic, and when the merchants' customers are still placing orders in more than average volume. But it is for him, just as it is for the manufacturer, a warning that the close of the prosperity period is not more than four to six months away. At this point he should change his policy of maintaining stock to one of reducing stock. By this is meant that, while sales are still going on at the old rate, the purchasing program should be sharply curtailed so that the goods moving out are not replaced at high prices and that inventories fall rapidly to a minimum or hand-to-mouth basis.

Here again, as in the case of the manufacturer, the advertising and selling departments can take positive steps, which are a valuable supplement to the negative safeguards used by the purchasing and credit departments.

During the first few months of the third or liquidation period of the mercantile cycle business is above normal, although it is declining. The policy which was started in the closing months of the prosperity period should be continued; that is, purchases of new goods should be smaller than sales. But the policy of safeguarding credits is more important than the reduction of stocks during this period. The great failures in the business world usually occur just at the end of the liquidation period or at the beginning of the fourth or readjustment period, but most of the credits on which these failures represent losses were extended during the earlier months of the liquidation period. Hence the credit man is one of the most important members of the organization during this period. The advice to "safeguard credits" might almost be changed to "curtail credits," for it is inevitable that the safeguarding operation will also involve some curtailment. However, especially in the early part of the liquidation period, it is still important to keep rather a heavy volume of goods moving, so that the real

kernel of the advice would be to give greater attention to prompt collections, to outside guarantees and to other safeguards, rather than merely to a policy of curtailment.

As the volume of business declines the merchant who has his overhead expenses set on a basis of prosperity will naturally find them absorbing an unreasonable percentage of his gross receipts. His policy should, therefore, be to curtail expenses. This is so obvious as to need very little comment. For the merchant, the policy of increasing efficiency is based on the same reasoning as that for the manufacturer.

The end of the liquidation period in the mercantile cycle is signalized by the improvement in the average of the factors which form the Commodity Price Barometer, with the resultant upward turn in the barometer itself.

When this has happened, the readjustment or fourth period is beginning. The curtailment of expenses should be continued and also the increase of physical and personnel efficiency. It is now time to plan expansion. This may take the form of some increase in equipment, as it does in the case of the manufacturer, or it may mean only arrangements for loans which will be necessary when the new cycle begins, or the seeking of additional salesmen to help push the coming expansion.

ADVERTISING AND SELLING POLICIES

In all early discussions of business policies through a cycle, a disproportionate amount of emphasis has been placed upon the variation of purchasing, producing and credit policies to meet the variation in general business conditions. Generally speaking these variations of policy consisted of a positive and aggressive attitude from the time when the end of a period of depression is in sight and then a negative or purely defensive attitude from the time a liquidation movement can be foreseen until the next rise is in sight.

So long as there are business cycles the business executive can never profitably forget this basic variation but, as stated in an earlier chapter, the man who seriously attempts to reach a given business goal must do a great deal more than merely "sail with the tide." He must realize which way the tide is flowing and must make allowance for its influence. Sometimes he must sail across it, sometimes with it, and sometimes directly against it. In no other department is this so profitable as in those carrying on the advertising and selling activities.

In order to emphasize this particular point, let us begin our discussion of such policies at the point where the coming of liquidation and general business contraction can be foreseen.

Few concerns which exercise such foresight fail to make some effort to minimize its effect upon themselves. Usually those concerns have healthy bank balances at such a period and the efforts usually fall into three classes.

(1) A general increase in selling and advertising appropriations.

(2) An application of "high pressure" selling methods.

(3) A greater extension of credits.

It would be foolish to say that these methods are not likely to cause at least a temporary increase in sales. However, it seems equally certain that they fail to reach the root of the matter. An advertising campaign which goes on reckless of expense, without reaching a reasonable number of possible purchasers, does nothing but gratify the vanity of its sponsors. Even snatching an order from a competitor who is also threatened with over-production leaves him with his goods and an additional incentive for competing more intensively on the next order. Certainly selling by high pressure methods to men who do not want your goods will be a temporary expedient. And just as certainly extravagant buying induced by unreasonable credit terms to either dealers or consumers will mean future damage.

At least a suggestion of a saner way to meet a probable decline in business is to be found in

the fact that neither prosperity nor depression ever strike all parts of the country in the same degree at the same time. This is true even of industrial districts, for various industries have uneven developments even though there is considerable tendency to uniformity because most industries control their production fairly quickly when a change comes in the general buying power. This is better illustrated by agricultural income, because the variation among sections of the country is even greater in agriculture than in industry. It is true that farmers do try to adapt their production to probable demand but, at best, their estimates are made so far ahead and from such inadequate bases of information that they are wrong almost half of the time. Furthermore, weather conditions, over which no control can be exercised, are frequently more effective in the variation of production than is the conscious control of the farmers. As a result, agricultural income is most apt to vary either as among localities or as between its changes and those of the rest of the general consuming market. In addition to this, the concentration of agricultural income at certain seasons of the year, as against the more steady flow of income in urban centers, makes it relatively easy to estimate, several months in advance, the approximate purchasing power of each locality. The variations are illustrated by

the accompanying map which shows an estimate of purchasing power for the crop year 1925-26 as against that for the preceding year. The data are localized to groups of counties, since variations of this character do not necessarily follow state lines. A similar map, though not quite so detailed as to locality nor quite so accurate in result, can be made for the purchasing power to come from industrial, mining or lumbering activities.

With such information the manager of sales or of advertising may profitably employ any one, or all, of the three standard methods to maintain his sales in spite of a general decline, just as the canoeist will increase his progress in going up a river if he has enough knowledge of the current to enable him to avoid its swiftest points.

The use of localized forecasts is equally important when the current of general business is about to begin a favorable flow. Prosperity appears as irregularly as does depression. The managers of the advertising and sales departments will choose the most profitable territories at this time, just as the canoeist picks out the swiftest part of the current when he is travelling with it.

One thing in particular that needs to be emphasized in the depressed period of the cycle is the value of an advertising policy that is not

only well directed but generous. It is perfectly true that money spent for advertising at the bottom of a depression does not yield results immediately, but it does have the advantage of relatively little competition in the mediums where it is placed, and the further advantage of reaching the customer at a time when he is not so occupied with his own business as he will be later when the prosperity has actually begun. Possibly this one characteristic of expanding advertising at the bottom of depression is one of the most certain ways of distinguishing a foresighted merchant from one who simply carries on his business in a routine way.

CHAPTER VIII

BANKING AND THE BUSINESS CYCLE

IN this discussion of the policy for a banking institution throughout a business cycle the viewpoint of a banking institution as a means of making profit for its stockholders is consistently maintained. It is true that most of the capital loaned or invested by a bank belongs to its depositors rather than to its stockholders and to that extent the matter of trusteeship is bound to be a factor in the policy of any bank. Temporary chances of excessive profits for the stockholders may seem to point to a policy which conflicts with this trusteeship of other peoples' money, but in the long range view the bank which loses any part of its depositors' money must first lose all of the money invested by its owners; so that we may consider the safeguarding of depositors' interests as being included in the more immediate matter of safeguarding stockholders' interests and keep to our idea of seeking the best profits for stockholders.

In the years before the Federal Reserve Act was passed there grew up a feeling that since

banks determined the disposal of liquid assets which belong to the entire community they were under moral obligations to support certain lines of industry valuable to the community as a whole whether such action yielded a profit to the stockholders or not. With the passage of the Federal Reserve Act this function of banking very largely passed into the control of the Federal Reserve Board and of its various agencies. It is still true that sometimes it is wise for a bank to sacrifice a temporary profit in order to build up industries which will cause a community or country as a whole to expand, but in the long run such a policy as this is profitable to the stockholders of the bank itself. For this reason the obligation to make such temporary sacrifices for the sake of the community as a whole may again be merged in the desire to make the largest possible long range profits for stockholders.

The closing period of a banking cycle is a period in which funds have become relatively plentiful and one in which we shall assume that the banker has been lending his aid to the financing of new construction. In the first period of the new cycle money rates are relatively low, funds still plentiful, and other conditions, which have been described in earlier chapters in discussing the policies of manufacturers and merchants, are such as to indicate

that the manufacturer or merchant who begins new business or expands his old business will reap an early profit. For those reasons this first period of the cycle is most specifically the time when banks may courageously lend their resources to the financing of new enterprises. There is no intention here to approve carelessness in the financing of enterprises which have no particular hope of success. It is assumed that the internal management of the bank itself will pass upon each individual enterprise as it presents its request for credit but that the directors will make their ultimate decision with the fact in mind that a reasonably organized new enterprise or a reasonable expansion of an old one has an exceptional chance for success if begun at this period of the business cycle.

As we come toward the close of the first period of the cycle the supply of funds for loans still remains plentiful but the demand is rising so that better rates are usually obtained on loans. At the same time there still remains in front of business in general a "prosperity" period in which liquidation of loans at maturity will be relatively easy. Therefore, when the rates begin to offer a satisfactory profit, the banks begin the policy of buying long term paper which gives them satisfactory current return and at the same time encourages their customers to keep on doing a good volume of profitable business.

This policy of buying long term paper carries forward into the second period of the cycle which is heralded by the fact that bank clearings tend to make new high records and that the same thing is true of the physical volume of business. Funds, however, at the time of the turn into the prosperity period are still plentiful. Before much progress has been made in this second period unloaned funds begin to decline and money rates are likely to reach the highest point which they can reach without indicating a really unsafe condition. The banker should continue his policy of buying long term paper as long as danger signals do not appear in the business world, for he will get good returns and still has the probability that the average borrower will have no difficulty in liquidating.

The next change of policy comes very near the close of the prosperity cycle. At this time the factors included in the barometer described in Chapter V give a four to six months' warning that the close of the prosperity period is at hand. At this time money rates are usually high and as a temporary matter of making profits there is a temptation to guarantee a long continuation of this high rate of return by the continued purchase of long term paper. However, the time has now come when credit dangers begin to multiply. This is one of the points of the cycle where a temporary chance for high profits may

well be sacrificed to the necessity for safety. Consequently, the policy becomes one of buying short term paper and watching carefully for changes in the credit position of each customer who asks for renewal.

This policy is carried on into the third or liquidation period of the cycle. The liquidation period usually begins with bank clearings still at their high peaks but with funds depleted, with security markets falling, and with the fundamental indications of the barometer in an unfavorable position. As the liquidation period progresses money returns to the banks and funds begin to accumulate while not only short term money rates but long term interest rates on bonds are still very high. The first use of these accumulating funds may well be the purchase of some long term bonds, for the banks' customers will not yet be needing additional loans and the bond market will be offering some exceptional opportunities.

This policy of investing surplus funds in long term bonds may well be carried over into the fourth, or readjustment period, until such time as the factors in the barometer give a warning that the readjustment period is drawing toward a close and the improvement period in general business is likely to begin. Here the general policy for bank management should be changed to the financing of new construction.

The reasons why new construction is a good thing for the manufacturer or merchant have been discussed in Chapter VII. Briefly stated they are that costs are low and the prospects for early profitable use are becoming bright. From the bankers' viewpoint we may add that these two factors add tremendously to the security of the loans, also that the banker has at his disposal a plentiful supply of funds at a time when the demand from general business is likely to be decidedly slack. For the commercial bank, which does not enter the mortgage market, the carrying out of this policy will mean the making of temporary loans to be ultimately liquidated as the construction is completed and permanent financing takes place. For the investment banker or the trust company it will take the form of relative liberality in the matters either of placing real estate mortgages or of underwriting bond issues for the financing of more extensive construction work in either transportation or industry. At the close of this period we enter again the first period and begin the cycle previously described.

As noted earlier this banking policy covers only general lines of action, or we might say, furnishes the background against which the active detail management of any individual bank will be carried on. Further, it must be remembered that no two cycles are exactly alike, and

it will be necessary for some one either in the bank or in an outside agency to keep alert for those factors which cause one cycle to vary from another and which may cause some variation in the policies during the progressive stages of a cycle.

As a final word we may well come back to the discussion of Chapters I and II. Business forecasting is not an end in itself, nor is it a magic device by which the inexperienced or inefficient may become successful. It is merely a machine for the use of experienced and efficient business executives.

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